The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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I.C.I.'s Second Annual Meeting

THE immense gathering of shareholders which filled the Central Hall, Westminster, on Thursday, for the second annual meeting of Imperial Chemical Industries was furnished with convincing evidence, from the speeches of Lord Melchett and Sir Harry McGowan, not only that their capital is in safe hands and that their dividends are assured, but that they have hardly yet begun to realise the advantages and returns that must come later from the expansions, improvements and economies now in progress. When this year's report appeared, we ventured to suggest that wise shareholders would not judge the position from the present conservative dividends but would look with satisfaction a few years ahead to the time when the present expenditure would have begun to earn profits. Lord Melchett, in his masterly and comprehensive review of the position, said something to the same effect. Up to now the great organisation has been spending, expanding and developing. Even so, its returns are extremely good. But as the new plants come into play, new markets are developed, new interests are acquired, and the great machine is brought to the efficiency that is contemplated, the results will be on a very different scale from those already attained.

Not that Imperial Chemical Industries exists to distribute immense dividends. Nothing was made clearer than that in Lord Melchett's speech, and nothing received more emphatically the approval of the meeting. British industrial concerns, he declared with emphasis, could only maintain their position by being content with a reasonably low distribution of profits. That was the policy of the I.G. and of the great American companies; they do not judge the value of their shares in terms of yield but in terms of earnings. Similarly, Imperial Chemical Industries were not going to dissipate their resources and prejudice their huge undertaking in order to obtain a passing popularity on the Stock Exchange with people mainly interested in the next settlement. The terms of the new issue were received with satisfaction, particularly the Chairman's announcement that in justice to the deferred shareholders no further deferred capital is to be issued. The new issue, to be offered first to shareholders, will exceed 10 millions—4,410,590 preference and the balance, of over 6 millions, ordinary. Preference shareholders will be offered one new preference share for every existing four held; ordinary shareholders will be offered one new ordinary share for every existing 8; and deferred shareholders will be offered one new ordinary share for every existing 16. The price will be 23s. for preference and 33s. 6d. for ordinary. Shareholders of all classes will be allowed to apply for any surplus.

A considerable place was given in Lord Melchett's speech to recent and contemplated technical and commercial developments. The principal one is at Billingham, where a "city of factories" has grown up under the direction of Colonel Pollitt, to whose energy and administrative ability a warm tribute was paid. Next to this comes the new agricultural research station. In the alkali industry—"the old war horse of the chemical industry," as Lord Melchett described it, "a steady goer and a certain money maker"—enormous changes, improvements and economies had been effected; the modern chemical works had become a much simpler and cleaner affair than it formerly was. As an example of the economies effected by these improvements, Lord Melchett stated that the average saving in the alkali industry in the past year amounted to 22 per cent. of the average capital outlay of 1927-28.

From Lord Melchett and from Sir Harry McGowan came convincing proofs not only of the internal efficiency of the organisation, but of immense expansions overseas—in Canada, Australia, New Zealand, South Africa, India and other areas. In a fine closing passage, Lord Melchett disclosed something of the present attainments of the company and of his great ideals for its future. It must have been pleasant for the shareholders to hear that during the first quarter the growth of profits was sufficient to meet the addi-

tional dividend required this year; still better to hear that the full benefits were not to be expected just yet, but might begin to appear in another two years or so. This great merger, Lord Melchett reminded us, was the first of its kind attempted in this country; it had already demonstrated that we were as capable of large-scale team work as the Germans or Americans, and it promised not only to be of advantage to the shareholders but to set a standard for British industry generally.

Mr. Churchill's Budget

It is impossible for the business man to look with enthusiasm upon a Budget which contemplates the continuance of Government expenditure at well over £800,000,000, and the maintenance of the standard rate of income tax at 4s. in the £. When he remembers the economic foundations of his own business he is amazed at the spectacle of a Chancellor of the Exchequer having to apologise to the House of Commons for venturing to mention the subject of economy. Still, things being as they are, Mr. Churchill's fifth and last Budget may be regarded as reasonably businesslike and sound. If the general trading community which is not obsessed by political programmes agrees in present circumstances to accept the position that no economies can be effected in Whitehall, and that it is the business of the State to provide a vast number of expensive benefits for all and sundry, then Mr. Churchill may fairly be congratulated on his proposals for tax collection and remission. Even more important, perhaps, than his actual proposals was the doctrine which he inculcated on the essential soundness of the commercial and financial position of the country. It is absolutely certain, however, that British trade will never be restored to abounding health until there emerges a Minister with the courage to insist on national economy as the basis of sound finance.

Tung Oil

Dr. G. C. Clayton, at the dinner of the Oil and Colour Chemists' Association on Tuesday, made a very important announcement regarding the production of tung oil. For some time past, the Research Association of the British Paint, Colour and Varnish Manufacturers has been investigating the possibility of producing tung oil within the Empire. Some difficulty was experienced at first in obtaining nuts for the necessary biological work, but this has now been overcome, and a large number of nuts have now been distributed to various countries in the Empire in order to find the best places for the establishment of plantations. It was clear from the tone of Dr. Clayton's remarks that there is every hope that the problem will be successfully solved. In view of the growing importance of the oil in various industries, the prospect of obtaining it from Imperial sources will be viewed with pleasure and relief.

Apart from this important statement, the dinner was the occasion of an extraordinarily witty and entertaining speech by Professor Thorpe. The art of public speaking is regarded with some suspicion by scientific men, and inasmuch as there is, in political and other circles, a habit of substituting rhetoric for facts, the suspicions are not altogether unreasonable. It is, however, a mistake to carry the suspicions to the point of thinking that the art of public speaking is not worth study. The reproach that men of science write crudely is no longer justified, and it is easy to call to mind numerous scientific authors whose most erudite works are couched in prose worthy of the great essayists; but it is still the fact that few scientific men can state their views in public with ease and clarity. Professor Thorpe is a notable exception, for his audience can listen to him with pleasure and interest on all occasions, ranging from those on which he is discussing the vagaries of the glutaconic acids to those on which he is indulging in the gentle art of leg-pulling. Meetings of all kinds would be brighter, and audiences more attentive, if scientific and technical men as a whole gave some attention to this important matter. If a thing is worth saying, it is worth saying well.

Books Received

The Making and Burning of Glazed Ware. By H. Ansell and A. B. Searle. London: H. Greville Montgomery. Pp. 268. 12s. 6d.

The Industrial Development of Searles Lake Brines. By John E. Teeple. New York: The Chemical Catalog Co., Inc. Pp. 182. $3.00.

The Calendar

Apl. 24	British Science Guild: Developments of British Chemical Manufactures. "Fertilisers from the Air." Sir Frederick Keeble. "Rayon (Artificial Silk)." A. B. Shearer. "Synthetic Drugs." Francis H. Carr. 4.30 p.m.	Mansion House, London.
25	Chemical Society: T. W. Richards Memorial Lecture. Sir Harold Hartley. 5.30 p.m.	Institution of Mechanical Engineers, London.
29	Society of Dyers and Colourists (Manchester Section): Annual Meeting. "Colour and Constitution from the Standpoint of recent Electronic Theory." H. H. Hodgson. 7 p.m.	36, George Street, Manchester.
May 1	Society of Public Analysts. 8 p.m.	Burlington House, London.
2	Chemical Society. 8 p.m.	Burlington House, London.
6	Society of Chemical Industry (London Section): Annual Meeting. "Recent Advances in Low Temperature Preservation of Foodstuffs." Dr. T. Moran.	Burlington House, London.
9	Oil and Colour Chemists' Association: "Painting as it Affects the Railways." F. Fancutt. 7.30 p.m.	30, Russell Square, London.
9	Optical Society. 7.30 p.m.	Imperial College of Science, London.
14	Institution of Petroleum Technologists. 5.30 p.m.	John Street, Adelphi, London.
15	Royal Society of Arts: "The Reform of the British Patent System." Robert Burrell. 8 p.m.	John Street, Adelphi, London.
15	Society of Glass Technology: Annual Dinner.	London.
16	Chemical Society. 8 p.m.	Burlington House, London.
17	Institute of Chemistry (Belfast Section): Annual General Meeting.	Belfast.
19	Society of Dyers and Colourists (Manchester Section): Annual Meeting. 7 p.m.	36, George Street, Manchester.
23	Faraday Society: Annual General Meeting. 7.45 p.m.	Burlington House, London.
24-25	Institute of Chemistry and Society of Chemical Industry: Joint Scottish Meeting.	Glasgow.
30	Chemical Society: Pedler Lecture by Professor W. H. Perkin. 5.30 p.m.	Burlington House, London.

Some Optical Properties of Paints and Pigments

A Paper Read Before the Oil and Colour Chemists' Association

A paper on "Some Optical Properties of Paints and Pigments" was read by Dr. F. C. Toy at a meeting of the Oil and Colour Chemists' Association held at the Institute of Chemistry, Russell Square, London, on Thursday, April 11. Dr. J. J. Fox (president of the Association) was in the chair.

DR. TOY said it had occurred to him, when preparing a report, in co-operation with colleagues in the photographic industry, on the optical properties of scattering media in relation to their importance in the photographic industry, that the problems investigated must be of extreme importance in the paint industry, because the latter industry was interested in covering power and particle size, and because the materials used in the two industries were so very much alike.

Dispersions

Dealing first with the optical properties of dispersions as far as they affected covering power, he said that in both industries the term "covering power" was very much abused. In the photographic industry, covering power measurements had been made by methods involving the covering up of a given contrast pattern, *i.e.*, a brightness difference. He dealt in detail with the factors involved in covering up a brightness difference. The troubles originated from the fundamental fact that the eye of any given observer could detect only differences of brightness when the brightnesses differed by more than a certain minimum ratio. This ratio varied not only with the observer, but with the intensity and the colour of the light, and even with the apparatus used.

Because of these difficulties he had been interested in the question of evolving a mechanical method of obtaining some idea of covering power. It was, of course, obvious that no mechanical method would ever give the true visual covering power under all possible conditions, but it seemed possible that dispersions could be graded in the correct order of covering power in a great number of cases. He believed this was a problem well worth investigation in the paint industry.

Covering Power and Grain Size

In the photographic industry they were interested in covering power not because of its value as such, but because of its use as a criterion of grain size. Dr. Toy exhibited some curves obtained by Mr. Farrow, of Ilford, Ltd., with the help of Mr. Crawford, of British Photographic Plates and Papers, Ltd., showing the relation between covering power and grain size, and explained why covering power was such a bad variable to use for size determinations. The method of Stutz and Pfund suffered from the same disadvantages, which the inventors recognised. There was first of all the existence of a maximum, which always caused doubt unless special precautions were taken; then the accuracy depended on the size investigated; and, further, one was never measuring a true constant of the dispersion. In addition to this, an alteration of covering power might be due to a change in surface, without any change in grain size.

Dr. Toy then described a new method, due very largely to Mr. Davies, of measuring grain size optically. It depended on measurement of the light which passed undeviated through a dispersion, when isolated from all scattered light—even that which came forward in the same beam. The success of the method—and experiments so far had shown great promise—depended on the extent to which this undeviated light consisted of light which had passed through the dispersion without touching the grains. Obviously, if the light did not touch the grains, then their surface characteristics would have no influence on its value, which would depend to a very large extent only on the size of the grains. Further experiments were being carried out by Mr. Davies, and, if they confirmed what had already been done, he believed it could be said definitely that although the method was far short of perfect, it was certainly better and more worth trying than any which had been suggested previously.

Discussion

Dr. G. F. NEW pointed out that the question of covering power was intimately bound up with colour; even the so-called white pigments were coloured, and he wondered whether the methods referred to by Dr. Toy would apply to the problems of the paint and pigment industry. Dr. Toy had separated the absorption and scattering effects, in essence, and colour was an absorption effect. The common idea was that a coloured pigment was a better covering agent than a white pigment, but there were cases in which a pure 100 per cent. coloured pigment had less covering power than a mixture of, say, 50 per cent. of that pigment and 50 per cent. of white pigment. In such cases, evidently, the scattering effect with the white pigment was more pronounced than in the case of the coloured pigment itself.

A further point was that necessarily Dr. Toy had had to base his work on assumptions as to the shape of the particles. Although, for anything which was not spherical, he could get an average effective radius, it must be borne in mind that particles which were not spherical would not necessarily remain in random distribution. Sometimes dye pigments with long crystals exhibited a peculiar striation, which was due obviously to the alignment of their particles in one direction. Dr. Toy's theory demanded that such particles should be distributed in a random manner, and it was doubtful whether, in an ordinary paint film, particles which were not spherical would be randomly arranged. In a paint film, even while wet, and even if one had started with perfect dispersion, he did not think there would be perfect dispersion for more than a few minutes; a paint film was judged for pigment power after it had solidified, and when the particles had probably re-arranged themselves on some sort of systematic basis.

Covering Power

Mr. C. A. Klein, commenting upon the slipshod manner in which the expression "covering power" was still used in the paint industry, said it was far too often connected with hiding power or obliterating power, or the staining power of a pigment, and from a practical point of view one needed to exercise great care, because, after all, one had to take into consideration the concentration of pigment that could be obtained in the vehicle used. He asked if Dr. Toy had taken into consideration the very serious problem of the variation of the sizes of particles in pigments. One could, and must, assume spherical conditions in the most elementary considerations, but a good deal of trouble arose when there was non-uniformity of size, and he knew no other way of getting down to the size structure, which he regarded as most important, than by separating the particles and trying to map out what the size distribution was.

Work of Stutz and Pfund

Dr. L. A. Jordan, referring to the Stutz and Pfund method of measurement, said that the New Jersey Zinc Co. had used it with considerable advantage. They had first used the method of obscuring the filament or getting two filaments of equal intensity. Then, instead of using the obscuring filament, they had applied the photometric method and had used two kinds of light—red and green—and by that method they could determine on which side of the maximum their actual experimental conditions lay. It was reasonable so far as it went. So long as they worked with zinc oxide they appeared to obtain very good results, and he believed the whole of their work was founded upon that instrument. It appeared, however, that sooner or later Dr. Toy would introduce an instrument which would put the Stutz and Pfund instrument out of court.

Mr. R. P. L. Britton said that the presentation of the instrument referred to by Dr. Toy had rather confused the issue in his mind, because it was put forward as a special means of investigating particle size. In his view, that did not couple up with real covering power, because the covering power of a pigment or paint was dependent to a very large extent upon the refractive index of the pigment itself in the particular medium used. That was not involved in this case, except, of course, that the nearer the refractive index of the pigment was to that of the medium, the greater would be the quantity of undeviated light, or light coming through the actual particle, and he understood that that light could not be dissociated from the light which had missed the particle altogether. That might be a source of trouble in the measurement of particle size.

The Oil and Colour Chemists' Dinner

An Important Pronouncement on Tung Oil

THE Oil and Colour Chemists' Association held its eleventh annual dinner at the Connaught Rooms, London, on Tuesday, the president, Dr. J. J. Fox, presiding.

The members and guests were received by the president, who was accompanied by Mrs. and Miss Fox. The guests present were Dr. G. C. Clayton, M.P. (who represented the Institute of Chemistry); Professor J. P. Thorpe, F.R.S. (president of the Chemical Society); Mr. J. Arthur Reavell (president of the Institution of Chemical Engineers); Mr. Godfrey Giles (president of the Incorporated Institute of British Decorators); Mr. George Stubbs, C.B.E. (of the Government Laboratory); Mr. H. J. Jones (National Federation of Associated Paint, Colour and Varnish Manufacturers); Mr. R. B. Pilcher (registrar and secretary of the Institute of Chemistry); and Mr. H. T. Tizard, F.R.S. (secretary of the Department of Scientific and Industrial Research). Others present were Mr. J. Russell Thornberry, Dr. J. N. Goldsmith, Dr. R. S. Morrell (past president), Dr. H. Houlston Morgan (past president), Mr. C. A. Klein (past president), Dr. L. A. Jordan (director of the Research Association of the Paint, Colour and Varnish Manufacturers), Mr. Noel Heaton, and Mr. H. Clayton (hon. secretary of the Manchester section of the Association).

Dr. Clayton's Speech

Dr. G. C. Clayton proposed the toast of "The Association." He was pleased to address the members and guests, he said, because they were all interested in research. As one who had spent eleven years in a research laboratory he could speak with first-hand knowledge of its value, and he considered that research chemists were the most essential people in this world.

Referring to the Research Association of British Paint, Colour and Varnish Manufacturers, he recalled that its establishment under the Department of Scientific and Industrial Research had followed a recommendation made by Dr. H. Houlston Morgan, in a paper he had read before the Royal Society of Arts in 1926, that such a body should be formed. He (Dr. Clayton) had visited the laboratories of the Research Association at Teddington, and he advised those who had not visited them to take the opportunity of doing so. The director was Dr. L. A. Jordan, and one of the vice-presidents was Dr. Morgan. A very excellent staff was carrying out a large amount of research work on a number of important problems —the treatment of oils, paint exposure tests, the permanency of colours, the provision of tung oil, etc.

Imperial Production of Tung Oil

Some interesting developments had taken place with regard to the supply of tung oil from sources within the Empire. The oil, which was essential for the production of certain varnishes, had in the past been produced from nuts grown in China. Difficulties having arisen in obtaining supplies of the oil, they in this country had attempted to obtain the nuts from China in order that they might be grown within the Empire, but they had been unable to obtain the nuts direct. Through the courtesy of Mr. Gardner, the manager of the American Tung Oil Corporation, however, 700 lbs. of tung oil nuts were obtained last year, and these had been distributed to 32 stations throughout the Empire—in Australia, New Zealand, South Africa, India and other places. There was no doubt that, as the result of that development, they would be able shortly to produce this raw material within the Empire. The work had been done in conjunction with the authorities at Kew, and the Empire Marketing Board was also helping. They wished to be independent, as far as possible, of any place outside the Empire, and when he had visited the research station he had rejoiced to learn what steps were being taken.

Another matter in which he had been particularly interested was the preliminary report of a sub-committee which had been set up by the Royal Academy of Arts to investigate the problem of artists' paints, which report was referred to in the February issue of the *Journal of the Oil and Colour Chemists' Association*. It had been discovered that certain of the Old Masters had become more brilliant since they were first painted, owing to the fact that the oil paint layer had become more translucent. A number of our more modern paintings, however, had faded. It was interesting that the work of investigation on this subject was being carried out under the auspices of the Association and other scientific bodies. The committee was also examining different types of canvas, and considering the replacement of size by viscose.

The president, on rising to respond to the toast, was received with prolonged applause. In the first place, he expressed pleasure that Dr. Clayton had been restored to health after his recent indisposition, and had honoured the Association by his presence. The members of the Association appreciated highly his reference to their work, because by training and outlook he was so well qualified to judge what they were doing. The Association was a progressive body. In the last few years it had increased its membership and its funds, and, though the funds were not large, the Association was not iu debt—a matter upon which a body of its dimensions could congratulate itself. A fact of which the Association was rather proud was that by its very existence, and by reason of the forceful personality of its past president, Dr. Morgan, it had been able to indicate to the trade, when the latter was faced with the threats of cellulose lacquers and other things, that it was time it began to look around and make provision for improvements. The lecture which Dr. Morgan had delivered before the Royal Society of Arts in 1926, and the work he had done behind the scenes, had resulted in the establishment of a very excellent research association. If the Oil and Colour Chemists' Association had done nothing else, the mere fact that it had moved in that direction, and had made the trade appreciate that there was something in research, would justify its existence for a good many years to come. The Research Association was a very active body. There was no lack of push and go about its director, and if it did not do great things in the future that would not be due to lack of effort on the part of the director and his able staff.

The Work of the Association

The work of the Oil and Colour Chemists' Association was done, not so much by active research, as by affording facilities for the exchange of views and for the discussion in public of matters of interest to the trade. It wanted to give every facility to those who would present papers to do so and to place their views before the public. Discussing some of the problems with which it was dealing, he referred first to the question of colour. The first thing to do was to decide what they wanted to specify when they talked of colour, and how they were to get two people to agree as to what a colour was. That was a matter upon which there had been enormous discussion, and the Association had fostered that discussion. On two occasions it had arranged for formal meetings for the discussion of the problem, and they had had good results; they had induced Dr. Jordan to talk about the matter, and he had put forward very important suggestions.

They really ought to refer to themselves as oil and colour chemists "and physicists," because an enormous proportion of the work published in the Association's "Journal" was physical in its basis and its outlook, and was chemical only in a secondary degree. The industry was to a large extent physical, and though chemistry was important also, it was not quite so all-important as some of the chemists had thought twenty years ago.

Finally, the president reminded the members of the severe loss suffered by the industry and the Association during the year by the death of Dr. Mollwo Perkin (a past president), and Mr. J. B. Shaw (the late chairman of the Manchester Section).

Mr. A. A. Drummond, M.Sc., proposing the toast of "The Guests," said he regarded it as the toast of the evening, because it was the primary purpose of the Association on this occasion to welcome its guests. It would be a colourless affair if the oil and colour chemists met on such an occasion without their guests. He might also argue that it would be lacking in oil—if one regarded oil from the point of view of its smoothing-down properties rather than its drying properties. Far be it from him to say anything about dryness in connection with the Association's guests (laughter). The array of distinguished people present was a source of great encouragement to the

Association, as one of the younger technical societies. The members were particularly pleased to welcome Dr. Clayton, who appeared in the multiple capacities of a representative of the Institute of Chemistry, a Member of Parliament, a member of the Advisory Council of the Department of Scientific and Industrial Research, and a prominent leader in the industrial world—a true captain of industry.

The presence of Professor Thorpe was in the nature of a triumph. If the Association were as aggressive as the president had suggested it was, he might say that this day was a red-letter day for the Chemical Society, that body having risen in repentance of its past neglect. This was the first occasion upon which the Association had been honoured by the presence of a president of the Chemical Society. The Association was particularly pleased to welcome Professor Thorpe, because the members appreciated his keen interest in and sympathy with the needs of the chemical technologist. His recent presidential address at Leeds was proof of that interest and of his advocacy and support of co-operation between science and industry.

The presence of Mr. Reavell, the president of the Institution of Chemical Engineers, added another link to the lengthening chain of connections between the Association and that Institution. The paint and varnish industry seriously lacked the application of chemical engineering, and it looked to the Institution of Chemical Engineers to help it out of the rut.

Professor Thorpe on Oil and Colour Chemists

Professor Thorpe, responding for the guests, said he supposed he had been selected to respond because he was president of the Chemical Society. That body called itself *the* Chemical Society; he had emphasised that point in America, in France and in Germany, and it was generally accepted that it was *the* Chemical Society, and that all other chemical societies were merely adjectived chemical societies (laughter). The Chemical Society was the oldest of the lot, and therefore he regarded himself—temporarily, of course—as the father of all chemists, whether technical or otherwise, always supposing that there were any real difference between the technical and the other variety. When he had entered the dining hall he had wondered what exactly the oil and colour chemists were, but the first man he had met was Dr. Fox, whom he knew as a very active member of the council of the Chemical Society, and one who had been concerned with the very difficult and important researches in connection with the infra red. He had seen a picture, not of Dr. Fox, but of his collaborator, holding a book entitled "Should the infra red be deported?" He was not prepared to express a final opinion on that matter, but, having heard Sir Robert Robertson give an account of the extraordinarily interesting work that had been done in this connection, he was inclined to think that the infra red should not be deported; not, at any rate, until the work had been completed.

He offered congratulations, on his own behalf and on that of the Society he represented, to the Association on the great progress it had made and the research it had fostered. There was no doubt that in these days, when very great advances were being made, and when new methods and new processes were coming forward, that all new methods and new processes must be considered in every aspect by the chemical industry. It had been his privilege, on the previous Sunday, to visit the wonderful works established at Billingham, where, without question, they had succeeded in outstripping the Germans and had ensured the predominance of the chemical industry of this country over that of the whole world. Anyone who visited those wonderful works and saw what had been done in the last ten years to establish the nitrogen fixation industry in this country would be utterly amazed, as he was.

Coal Liquefaction in South Africa

THE Government of the South African Union was said, some time ago, to be studying the possibilities of the production of artificial petrol from South African coal, with a view to rendering the country independent of the monopoly of the large oil concerns. The *Frankfurter Zeitung* now reports that Dr. Lategan, a representative of the Union Government, has been to Germany for the purpose of personal discussions with the parties concerned, and that, on the strength of his report, the Government of the Union has submitted proposals to the I.G., which is at present considering them.

Institution of Chemical Engineers

New Elections to Membership

THE following have been elected to the grades of membership of the Institution indicated:—

Members: Sydney George Barker, Ph.D., D.I.C., Director of the British Research Association for the Woollen and Worsted Industries, Leeds; John Edwards, B.Sc., A.I.C., Wm. Butler and Co. (Bristol), Ltd., Bristol; Jack Hollins, A.M.I.Mech.E., Electro Bleach and By-Products, Ltd., Middlewich, ; Ernest Leese, Wilson's (N.Z.) Portland Cement Co., Ltd., North Auckland; William James Lowey, John F. Carmichael and Co., Liverpool; Harold Adolphus Morfey, Shelton Iron, Steel and Coal Co., Stoke-on-Trent; Albert James Pelling, M.Sc., A.I.C., Magadi Soda Co., Ltd., Northwich; Edmondson Spencer, B.Sc., Ph.D., A.R.S.M., A.R.C.S., F.I.C., Bird and Co., Calcutta. *Transferred to Membership;* Edward Kinsella, A.M.I.Mech.E., British Celanese, Ltd., Spondon; Douglas Robinson Wattleworth, United Steel Companies, Whitehaven.

Associate Members.—Moreshwar Ganesh Khotibhaskar, B.A., M.Sc.Tech., A.I.C., Mysore Iron and Wood Distillation Works; Charles Maurice Keyworth, M.Sc., F.I.C., Calico Printers' Association, Glasgow; Archibald Knox, A.I.C., Brand's Pure Spelter Co., and the Kyle Chemical Co., Irvine; George Lawton, B.Sc., Ph.D., A.I.C., International Standard Electric Corporation, Hendon; Henry Lawrence Long, B.Sc., A.I.C., College of Technology, Leicester; William Reginald Dermot Manning, B.Sc., Brunner, Mond and Co., Ltd., Northwich; Charles Henry Whatmore, Ranipet, South India.

Graduates: Lawrence Walter Blundell, M.Sc., A.R.C.S., D.I.C., Imperial College of Science and Technology; William Aldred Hayward, M.Sc., A.I.C., University College, London; Samuel Arthur Leivers, B.Sc., Corporation Chemical Works, Leicester; Ian Bruce McCrae, B.Sc., University College, London; Josiah Dawe Parsons, B.Sc., A.R.C.S., Imperial College of Science and Technology; Sydney Parker Roach, B.Sc., Imperial College of Science and Technology; Alec Webster, M.Sc., London Leather Industries Laboratory; Arthur Baker Winterbottom, M.Sc.Tech., Ferranti, Ltd., Manchester.

Institution Activities

For the World Engineering Congress to be held in October next at Tokyo, the following papers have been submitted: "The Training of a Chemical Engineer," by Professor J. W. Hinchley; "Pulverised Fuel," by Dr. J. T. Dunn and Dr. Burrows Moore; "The Industrial Importance of the Heterogeneous Character of Coal Seams," by Dr. F. S. Sinnatt; "By-Product Ammonia: Some Economic Considerations," by P. Parrish; "The Mathematical Theory of Filtration," by A. J. V. Underwood; "The Treatment of Oil Shales," by T. M. Davidson; "Briquetting with Smokeless Pulp Binders," by C. J. Goodwin; "New Types of Silicon Iron Acid Pumps," by Walter Hayhurst. In connection with this Congress, intimation has been received that the Air Express Co., Ltd., of Croydon, will be pleased to make arrangements for members travelling to Tokyo to make the journey by aeroplane, thus saving a considerable amount of travelling time.

The 1929 examination for the Associate-membership is being held on similar lines to those of previous years, except that a longer time is being given to the "home" paper, and a period is to be allowed to elapse between the two sections of the examination. The time allowed for the "home" paper was February and March, while the remaining papers will be taken in July as usual.

The degree of M.Sc. of London University was recently granted, for the first time, for theses in chemical engineering. Messrs. L. W. Blundell, W. A. E. Rae, F. F. Rixon and R. C. Rogers, Graduates of the Institution, were successful.

On May 8 a joint meeting will be held with the Institute of Fuel, the subject for discussion being the scope of the chemical engineer in relation to the fuel-consuming industries.

A new section of the Institution came into being at the end of last year for graduates and students only. The inaugural meeting was held on November 23, the president occupying the chair. A paper on the production of ferrous sulphate from scrap iron was read by Mr. W. A. E. Rae. The next meeting of the section will be held on April 26, Mr. F. H. Rogers presiding.

Overseas Chemical Trade in March

Still a Slight Lull in Activity

THE Board of Trade returns for March indicate that the value of imports of chemicals, drugs, dyes, and colours during the month was £1,328,404, a decrease of £116,611 on March, 1928; the value of exports was £2,220,626, a decrease of £38,148; while the value of exports of imported merchandise was £76,445, an increase of £1,527. For the three months ended March 31, 1929, imports were valued at £4,011,232, an increase of £67,913; exports at £6,386,905, an increase of £60,181; and exports of imported merchandise at £201,031, a decrease of £20,668. The detailed figures are as follows:—

Imports

	Quantities Month ended March 31,		Value Month ended March 31,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1928.	1929.	1928. £	1929. £
Acid Acetic .... tons	1,406	1,471	59,667	50,691
Acid Tartaric .... cwt.	5,480	3,575	34,429	25,348
Bleaching Materials ,,	17,421	10,917	13,239	10,720
Borax..... ,,	4,690	12,317	5,174	9,478
Calcium Carbide ,,	61,100	45,058	38,171	27,468
Coal Tar Products Value	—	—	22,395	51,230
Glycerine, Crude cwt.	442	240	1,342	533
Glycerine, Distilled ,,	1,164	404	3,944	1,076
Red Lead and Orange Lead ..... ,,	2,936	3,449	4,161	4,575
Nickel Oxide. . ,,	254	89	1,186	348
Potassium, Nitrate ,,	15,013	6,824	16,453	7,048
Other Potassium Compounds..... ,,	317,843	400,594	100,510	108,384
Sodium Nitrate .....,,	276,576	374,062	147,939	186,210
Other Sodium compounds ..... ,,	54,015	42,537	35,635	32,736
Tartar, Cream of .. ,,	4,262	4,271	17,318	19,062
Zinc Oxide ..... tons	1,125	837	34,585	24,944
All other sorts .. value	—	—	290,913	274,048
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts ..... oz.	177,519	135,008	12,970	10,901
Bark Cinchona (Bark Peruvian, etc.) cwt.	1,880	384	8,752	1,397
Other sorts .....value	—	—	132,635	122,644
DYES AND DYESTUFFS, ETC.—				
Intermediate Coal Tar Products ..... cwt.	10	342	103	4,545
Alizarine ..... ,,	119	48	5,171	1,243
Indigo, Synthetic.. ,,	—	—	—	—
Other Coal Tar Dyes,,	3,401	3,128	86,224	68,555
Cutch ..... ,,	5,315	5,999	9,005	9,803
Other Dying Sorts ,,	3,644	3,772	10,836	10,589
Indigo, Natural ...,,	71	—	1,698	—
Extracts for Tanning,,	155,787	71,475	169,361	86,476
PRINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe..... cwt.	64,983	44,442	15,280	9,698
White Lead (Dry) ,,	15,402	14,721	22,614	25,415
All Other Sorts ,,	88,467	105,349	143,305	143,239
Total of Chemical, Drugs, Dyes, and Colours .. value	—	—	1,445,015	1,328,404

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric... cwt.	14,471	1,825	4,804	1,896
Acid Tartaric .. ,,	3,012	1,581	20,306	11,428
Ammonium Chloride ..... tons	625	297	12,071	6,254
Ammonium Sulphate—				
To Spain and Canaries tons	4,423	6,470	45,346	65,174
,, Italy ..... ,,	127	491	1,291	4,578
,, Dutch East Indies tons	3,966	891	41,904	9,446
,, Japan ..... ,,	7,001	13,467	72,459	139,779
,, British West India Islands and British Guiana tons	864	493	8,839	5,015
,, Other Countries,,	7,177	15,372	72,503	161,675
Total .. ,,	23,558	37,184	242,342	385,667
Powder, Bleaching cwt.	42,019	51,131	15,338	15,247

	Quantities Month ended March 31,		Value Month ended March 31,	
COAL TAR PRODUCTS—	1928.	1929.	1928. £	1929. £
Anthracene ..... cwt.	—	—	—	—
Benzol and Toluol..gall.	5,100	22,250	481	2,037
Carbolic Acid .. cwt.	30,334	18,674	55,038	28,313
Naphtha ..... gall.	6,703	7,657	463	827
Naphthalene .... cwt.	2,713	9,889	1,090	4,266
Tar Oil, Creosote Oil, etc. ..... gall.	2,476,914	4,496,147	91,464	126,646
Other Sorts ..... cwt.	102,274	26,156	41,159	12,457
Total value	—	—	189,695	174,546
Copper, Sulphate of tons	11,144	9,217	255,947	232,068
Disinfectants, Insecticides, etc. ..... cwt.	38,094	32,093	91,786	76,681
Glycerine, Crude ... cwt.	5,397	630	17,149	861
Glycerine, Distilled .. ,,	14,828	8,138	59,344	21,740
Total .. ,,	20,225	8,768	76,493	22,601
POTASSIUM COMPOUNDS—				
Chromate and Bi-chromate..... cwt.	3,166	1,655	5,466	3,311
Nitrate (Saltpetre) ,,	1,478	1,036	2,800	1,918
All Other Sorts ... ,,	5,211	4,871	11,605	12,651
Total .. ,,	9,855	7,562	19,871	17,880
SODIUM COMPOUNDS—				
Carbonate, including Soda Crystals, Soda Ash and Bicarbonate cwt.	490,710	412,350	132,625	116,182
Caustic..... ,,	206,233	130,010	138,012	93,927
Chromate and Bi-chromate..... cwt.	4,325	1,821	5,835	2,900
Sulphate, including Salt Cake ..... ,,	32,959	32,861	5,360	4,153
All Other Sorts .. ,,	76,278	77,463	83,569	86,761
Total .. ,,	810,505	655,505	365,401	303,923
Zinc Oxide ..... tons	136	191	5,798	7,016
Chemical Manufactures, etc. all other Sorts value	—	—	295,124	294,325
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) ... value	—	—	1,594,976	1,549,532
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts ..... oz.	105,246	134,774	10,741	13,497
All other Sorts value	—	—	233,596	242,147
Total .. ,,	—	—	244,337	255,644
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	9,966	14,557	71,092	85,354
Other Sorts ..... ,,	10,121	7,116	9,632	7,030
Total .. ,,	20,087	21,673	80,724	92,384
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe ..... cwt.	3,233	2,407	1,373	1,403
White Lead (Dry) ,,	4,203	6,004	7,801	11,891
Paints and Colours in paste form .... ,,	52,164	45,069	104,374	89,037
Paints and Enamels Prepared (including Ready Mixed) ..... ,,	37,981	42,371	119,557	133,436
All Other Sorts... ,,	61,280	48,395	105,632	87,299
Total .. ,,	158,861	144,246	338,737	323,066
Total of Chemicals, Drugs, Dyes and Colours.....value	—	—	2,258,774	2,220,626

Re-Exports

	Quantities Month ended March 31,		Value Month ended March 31,	
	1928.	1929.	1928.	1929.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Tartaric .... cwt.	99	83	803	696
Borax..... ,,	1,620	860	2,159	603
Coal Tar Products value	—	—	395	2
Potassium Nitrate cwt.	112	1,419	158	1,370
Sodium Nitrate .. ,,	1,256	339	798	185
Tartar, Cream of ,,	679	382	3,165	1,894
All Other Sorts.. value	—	—	22,484	17,753
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts ..... oz.	10,432	18,782	1,024	2,005
Bark, Cinchona, etc. cwt.	154	569	634	3,140
All Other Sorts.. value	—	—	31,625	35,116
DYES AND DYESTUFS—				
Cutch..... cwt.	1,984	1,926	3,079	3,223
Other Dyeing Extracts ..... ,,	122	384	486	3,946
Indigo, Natural .. ,,	7	6	172	138
Extracts for Tanning,.	1,033	502	1,210	716
PAINTERS' COLOURS AND MATERIALS .... cwt.	1,930	1,445	5,943	5,525
Total of Chemicals Drugs, Dyes and Colours .. value	—	—	74,918	76,445

Boiler Firing

Importance of Gas Producer Systems

AT a meeting of the Manchester Section of the Society of Chemical Industry held on Wednesday, April 12, Mr. T. R. Wollaston, M.I.Mech.E., read a paper on the subject of boiler firing. In dealing with the practical advantages, so far as steam costs were concerned, of the combustion of solid fuels on gas producer lines, Mr. Wollaston explained that these lines were originally proposed by well-known chemists, who had, however, ignored certain thermal requirements vital to high efficiency.

Perhaps the most important claim with regard to the efficiency of the gas producer system was that steam could be raised at high efficiency from poor and waste fuels, such as could not be used for steam raising with any degree of satisfaction by any other known system. This claim called for explanation. The users of gas producers did not like highly bituminous and caking coals, and, in the form so far applied for steam raising, the producer furnace was subject to the same limitation. Caking coals could be used, but not with the inexperienced attendance at which one aimed. On the other hand, practically any non-caking fuel, coal, coke-breeze, furnace char, and the like, could be utilised with ease and full efficiency.

Specifications of the Fuel

Good work at full normal efficiency had been done with fuel the whole of which would pass ½ in. mesh, but it was usual, unless previous trial could be made with a proposed fuel, to require that 70 per cent. should be retained on ⅛ in. mesh. Such a specification would include almost any breeze produced by gas works and coke ovens, and also most colliery residues after screening. So far as was yet known, high ash content was only a limitation in so far as more labour was involved in its removal, and this limitation could be overcome by patented mechanical ashing gear. Producer boilers had worked throughout the past year on small fuel averaging over 50 per cent. ash without any trouble, even though this ash had an unusually low fusion temperature. A water-jacketted producer acted primarily as a means of absorbing usefully the radiant heat of the oxidation zone, and also functioned to maintain this zone at a temperature below that of ash-fusion, and, in any case, to prevent that bugbear of producer practice, adhesion of clinker to the walls. Up to 30 per cent. of moisture in the fuel, no deleterious results nor loss of efficiency had been detected. Beyond this point, however, there were as yet no reliable data available.

It should be noted that these claims, which might well appear extravagant if based only upon laboratory experiment or tests upon a single isolated boiler, were, on the contrary, founded upon the consistent performance of at least a dozen boilers of different sizes and types in daily work over the last four years. Apart from the labour-saving and hygienic advantages of the system, the possible reductions in steam costs were truly remarkable, and guarantees upon a simple, but it was believed reliable, basis could be freely given when substituting producer boilers for existing ones. There had been cases of collieries, gas works, and the like, where practically valueless residues were available, and where reductions in steam costs amounting to as much as 70 per cent. had been guaranteed.

The time appeared to be arriving when coal carbonisation by low and high temperature systems would be almost universal, and when coal would be purchased on analysis and intrinsic thermal value. These changes would undoubtedly lead to markets glutted with poor and cheap residues, and Mr. Wollaston submitted that gas producer systems provided the rational solution of the problem.

Pulverised Fuel

While not desiring to initiate any competitive arguments as between the systems of producer firing and pulverised fuel, Mr. Wollaston suggested that had the submissions contained in his paper been available and assimilated 20 years ago, pulverisation would never have entered the field as a competitor in steam raising. There was a close practical analogy between the two. Both enabled one to dispense with the grate and to maintain continuously good conditions for approximately perfect combustion of the fuel by dividing the latter respectively into small particles (in pulverisation) and into molecules (in gasification). It could hardly be questioned that of the two the latter was the easier to combine and ignite.

Pulverisation involved the expenditure of a considerable amount of power, with its accompanying wear, tear, and maintenance costs; gasification more closely approached static preparation. Some of the keenest advocates of pulverisation agreed that it could only excel, for example, chain grate firing when it made possible the utilisation of lower grade fuels; but low grade fuels generally implied high ash and moisture. High moisture appeared to be a serious limitation in pulverisation, and, as regarded high ash, it cost just as much to pulverise the ash as the combustible matter.

The production and emission of grits when working with pulverised fuel seemed at present to be a serious limitation, which would, no doubt, ultimately be overcome, but there still remained the question of the removal of slag and clinker from the boilers. One limitation often raised regarding pulverised fuel was that, when it could be and was burned with a high degree of chemical perfection, for example to show 17 per cent. of CO_2 in chimney gas, the ensuing furnace temperature was too high for refractory furnace walls. The same argument applied with regard to producer firing, with the difference that while it was believed that highly incandescent walls were essential with pulverised fuel they were certainly not essential with gas. The solution of this problem with the producer-fired boiler was a simple one, but involved partial redesign of the boiler itself so that the flame, until its temperature was considerably tempered, had no direct contact with refractory walls but passed only steel surfaces, in the form of tubes or otherwise, with water contact on the opposite side. Under such conditions there need be no limitation to surface temperature.

The John Benn Hostel

SIR ERNEST BENN (President) presided over the annual meeting of the East End Hostels Association, at the John Benn Hostel, on April 11. There was a large attendance. In submitting the annual report and balance sheet, he said that it cost £6,000 a year to run the Hostel and the Milner Hall, and after the usual sources of revenue had been exhausted they required a further sum of £2,000, which he appealed to all present to assist in raising. Mr. R. McKenna seconded and the Earl of Feversham, Chairman of the Council, supported the motion. In the course of the speeches, the Mayor of Stepney described the John Benn Hostel as one of the most valuable and well-organised charities in the Borough, and Mr. Clarke Hall, the well-known East End magistrate, testified to the immense value of the hostel in relation to East End boy life.

Basic Industrial Minerals: No. VI.—Magnesite

By G. Malcolm Dyson, Ph.D., A.I.C.

MAGNESITE is a broad term which covers almost a multitude of varieties of magnesium carbonate in various states of purity and physical condition. Since these differences have a very considerable effect on the commercial value of the product, it is of interest to consider them in some detail. With regard to the physical condition of magnesite, the mineral can occur in coarsely crystalline form, as in the magnesites of Canada and Central Europe (which are commercially very important), while the compact form, which resembles chalk in appearance, is found mainly among the deposits of India, Greece, and California. The impurities which are present in the various deposits of magnesite may vary very considerably. The two main impurities are iron, in the form of its carbonate, and silica, which is particularly undesirable in view of the fact that the majority of magnesite must be calcined at a high temperature before use; the presence of any appreciable amounts of silica leads to slagging and considerable lowering in the quality of the final product. The amount of iron is not usually more than 5 per cent., but in some cases it may almost approach the proportion $MgCO_3.FeCO_3$, in which case the mineral is known as breunnerite.

The Possibilities of Dolomite

Another of the more important impurities in magnesite is calcium carbonate. When this impurity is present in any substantial proportion the deposit is said to be dolomitic, and is of little value commercially. Many attempts have been made to utilise the enormous quantities of dolomite (calcium-magnesium carbonate), which are available; but the great difficulty is the separation of the calcium and magnesium on an economic basis. Any such process starts with the disadvantage that one of the products—the calcium carbonate—can be obtained cheaply from other sources. It is probable that increasing attention will be paid to this matter, and also to the general purity of magnesite, as the use of metallic magnesium spreads. It is a metal with an enormous future, and is at present used in a variety of metallurgical operations. Thus, it is used for the deoxidation and desulphurisation of metals, especially nickel, in the casting of aero parts, especially motor cases, crank cases, pistons, etc.

When the use of the metal extends, the same problem will arise as has already arisen and been solved in connection with aluminium, namely, the provision of a supply of pure magnesium salts. Providing that high-grade magnesite is available the matter is simple, but if this supply should give out the problem of the economic extraction of magnesium from dolomite will come to the fore.

Caustic Magnesite

Caustic magnesite, which is in considerable demand for various chemical and industrial purposes, is prepared by the calcination of the native mineral. This is a matter of some considerable intricacy, since over-calcination prevents the best results being obtained when the product is used for plastic magnesia cements. Kilns with automatic temperature regulation are to be preferred for this operation, more especially as the loss of carbon dioxide is attended by obscure changes in the physical condition of the magnesite, the precise nature of which is unknown, and which can only be controlled by very accurate repetition of treatment. A temperature of 800° C. is recommended for the production of caustic magnesite. Another aspect of the problem is worthy of some consideration, namely, the effect of the presence of a small amount of calcium carbonate in the original material. When used for plastic magnesia cements, the presence of a few per cent. of lime exercises a very bad influence on the setting of the mixture, while the presence of the calcium as carbonate has no effect, and merely occupies the rôle of an inert diluent. Accurate control is, therefore, necessary, so that the pressure and temperature of the kiln are such that almost complete decomposition of the magnesium carbonate is attained before the calcium carbonate is affected.

There are two main methods of calcination, depending on whether or not the carbon dioxide is to be recovered. If there is no local demand for this gas, then a simple type of calciner may be used,. As usual, the rotating shaft type of furnace is favoured, the crushed and hand-picked magnesite being fed in at the top and the heating gases ascending the furnace. Either producer gas or powdered coal firing may be used, although the latter is generally found to be less costly, and actually more convenient, since the calcination is almost invariably done at the mine. The reason for this will be evident when it is remembered that 52 per cent. of magnesite is lost as carbon dioxide during calcination, and that this, if removed at the mine, means a 50 per cent. cut in freightage. Occasionally, where the local demand warrants it, the carbon dioxide is collected, washed, and compressed into steel bottles. In such a case it is necessary to dispense with the usual type of rotating shaft furnace, and to substitute a series of steel retorts in which the magnesite is calcined by external heating. This becomes necessary in order that the carbon dioxide shall not be contaminated with the products of combustion of the fuel. It is said that the calcined magnesite prepared by the retort process is much better than the ordinary type for the manufacture of jointless floors, and that the smaller unit type of calcination plant will, in time, displace the cruder method. This is to be doubted, since the operating costs are much higher.

Magnesia Plastics

The original patents concerning plastic magnesia cements were taken out by Sorel, who had observed that when magnesia (in the form of caustic magnesite) was mixed with a strong solution of magnesium choride, it set to a hard mass of considerable mechanical strength, and that various "fillers" could be added to the mix without any appreciable alteration in strength. This simple reaction is the basis of the present industry of jointless flooring, etc., which has risen to substantial proportions in the last few years. Various attempts have been made to follow the course of the setting reaction. Bender, in 1871, suggested that the compound $MgCl_2$, $5MgO$, $14H_2O$, was formed, but many other formulæ were also suggested, until Robinson and Waggaman finally cleared up the question by studying the problem from a physico-chemical standpoint. They found that by using standard conditions they could reproduce the same substance repeatedly, and that its formula was $3MgO$, $MgCl_2$, $1OH_2O$. It is clear, however, that in the actual cements other constituents are present, and that the material is really a solid solution in which the above complex, the chloride and the oxide all take part.

The magnesium chloride for the European plastic cement industry can be obtained from the mother liquors of the Stassfurt extraction processes, and it was at one time distributed as a syrupy solution. At present it can be obtained in a flaky solid form that is more easily handled. The necessity for a pure magnesia has already been emphasised, but it may be of some interest to give the analyses of some average samples of magnesite (calcined caustic) which have given satisfaction in the manufacture of cements:—

	Origin of Sample.		
Constituents.	California	India	Greece
Magnesia, Total	89·65	87·12	90·21
Ignition Loss	5·07	6·00	4·87
Carbon Dioxide	2·63	1·54	0·66
Silica	2·53	5·64	2·65
Lime (Active)	1·57	1·16	0·27
Lime (Water Soluble)	0·38	0·24	0·09
Lime (Total)	2·38	1·54	1·58
Iron and Aluminium Oxides	0·40	0·25	0·59

The advantages of the use of cements of this description has been adequately described in many recent accounts. and their repetition is not necessary here in detail. It may, however, be pointed out that in addition to being resilient, elastic and hard wearing, these floors have a definite germicidal activity. If *Bacillus Coli* be spread on a magnesium oxychloride floor, the bacteria are killed in six to twenty hours, while with the ordinary type of wooden or cement flooring they are alive and active after this period. This point should be of interest in connection with hospital floorings. L. C. Stewart (*J. Ind. Eng. Chem.*, **19**, p. 1142) has determined the strength of various

types of flooring made with magnesia, and gives the following interesting figures :—

Property.	Strength—Lbs./Sq. In. After 1 Day.	After 7 Days.	After 30 Days.
Tensile Strength	536	745	946
Transverse Strength (Modulus of Rupture)	1,475	2,383	2,583
Compressive Strength	—	5,784	7,075
Modulus of Elasticity	—	3,165,000	3,000,000
Brinell Hardness	—	22	23
Scleroscope Hardness	—	16	16

Dead-burnt Magnesite

If the process of calcination be continued past the stage at which caustic magnesia is formed, the final product is quite altered in its properties, and is then available for use in the manufacture of various types of refractory compositions. The temperature of working for such a process is between 1600° and 1700° C., and after the loss of the carbon dioxide which the raw magnesite contains, it has been observed that the material shrinks and totally changes its structure, especially if the heating be continued to incipient fusion. This refractory is in considerable demand, not only on account of its resistance to heat, but also on account of its resistance to wear and its basic chemical properties. For these reasons it finds extensive application as a lining for open hearth furnaces and converters where its basic nature enables it to absorb acidic impurities. Its use, too, for crucibles required for melting pure metals is increasing and it constitutes an ideal material for the lining of rotary kilns. It is a curious but well-established fact that dead-burnt magnesite can be prepared satisfactorily at a much lower temperature if iron is present, and for this reason the ferruginous deposits of Europe and the States are able to compete with the much purer deposits of India and Greece.

Miscellaneous Uses

There are several outlets for magnesite in the chemical industry. As a neutralising agent and precipitant it has displaced lime in many of the operations connected with the manufacture of stearin, glycerol and soap, while it is used for similar purposes in the sulphite process of paper manufacture. In the explosives industry, it can be used in place of diatomaceous earth for the absorption of nitroglycerol in the manufacture of dynamite, and as a filler it finds application in the manufacture of motor tyres. Certain varieties of vitreous porcelain are prepared from it, and the oxychloride cement has been found to adhere to wood so tenaciously that it can be applied to the protection of timber, especially railway sleepers.

Annual Meeting of Ceramic Society

THE Ceramic Society held its annual meeting at the North Staffordshire Technical College, Stoke, on Monday, April 8, Mr. Arthur Heath presiding. A gold badge, valued at £50, subscribed for by the sixteen past presidents, was formally handed to the president to be worn on important occasions. The ceremony was introduced by Mr. H. J. C. Johnston, who said that, acting on the suggestion of the general secretary (Dr. J. W. Mellor, F.R.S., principal of the School of Pottery), he got into touch with the past presidents, and they agreed to subscribe. They thought it appropriate that the badge should be presented prior to the visit of the members of the society to the United States of America at the end of April. Mr. Bernard Moore, the oldest past president, made the presentation, and commented upon the fact that the Society was wielding great influence in this country and various parts of the world. Mr. Heath, the president, was invested with the new badge of office. The president mentioned that the Council had been considering a trip to Germany in 1931, and had given instructions to the general secretary to make preliminary arrangements. In his address, Mr. Heath said the closing session had been one of the most eventful in the history of the Society, embracing, as it did, the visit of the American Ceramic Society, the formation of the Building Materials Section, and the reconstruction of the governing body. Mr. Heath dealt with the formation of the Building Materials Section, and the consequent loss of identity of the Pottery Section, to which the Society owed its origin. In the election of officers, Mr. H. J. C. Johnston proposed the election of Mr. W. I. Gardener, of Meltham, near Huddersfield, as president for the ensuing year. The resolution, which was seconded by Mr. Heath, was carried unanimously.

China Clay Exports—March, 1929

A RETURN showing the quantities and values of the exports of China Clay, including Cornish or China Stone, the produce of Great Britain and Northern Ireland, from Great Britain and Northern Ireland as registered in the month of March, 1929, is as follows :—

Country of Destination.	Quantity. Tons.	Value. £
Sweden	1,275	4,203
Norway	1,996	3,658
Denmark (including Faröe Islands)	530	1,460
Germany	17	87
Netherlands	3,732	7,710
Belgium	5,879	10,659
France	3,609	7,618
Switzerland	91	280
Portuguese East Africa	177	651
Spain	3,264	8,077
Italy	2,404	5,234
Greece	36	145
China	24	118
United States of America	12,908	29,473
Chile	1	5
Brazil	20	71
Argentine Republic	2	13
Irish Free State	—	4
Union of South Africa	2	39
British India, via Bombay	1,467	4,850
via Madras	11	56
via Bengal, Assam, Bihar and Orissa	275	1,159
Australia	21	124
Canada	35	150
Total	37,776	85,850

China Clay Imports—March, 1929

A RETURN showing the quantities and value of China Clay (including China Stone) imported into Great Britain and Northern Ireland as registered in the month of March, 1929, is as follows :—

Countries Whence Consigned.	Quantity. Tons.	Value. £
Czechoslovakia and Total	—	4

The Manufacture of Glazed Ware

MESSRS. H. ANSELL and A. B. SEARLE have written a book on *The Making and Burning of Glazed Ware*, which has just been published by H. Greville Montgomery (pp. 269, 12s. 6d.). As explained by Mr. Searle in the preface, this volume was originally begun by Mr. Ansell, with the intention that it should be a thoroughly revised version of his earlier work entitled "The Manufacture of Glazed Bricks and Glazed Sanitary Ware." He was unable to complete it, and the task of doing so was therefore assumed by Mr. Searle, who, in addition to knowing very clearly the intentions of Mr. Ansell, has been able to make various additions and amplifications suggested by his own experience. It deals essentially with the practical side of the subject. Some idea of the scope of the book may be obtained from the chapter headings: The raw materials; the purification and preparation of fire-clays; white engobes or slip-coatings; coloured engobes; glazes; enamels; the storage of engobes and glazes; applying engobes and glazes; decoration; the manufacture of glazed bricks; glazed tiles; glazed terra-cotta; glazed sanitary ware; salt-glazed ware; stoneware, fine earthenware and porcelain.

I.C.I.'s New Issue of Capital

THE directors of Imperial Chemical Industries have noticed that it is being assumed that the new issue of capital will consist of the £20,000,000 of additional capital which the shareholders were asked to authorise at the annual meeting on Thursday. This is a misapprehension. The company has at present £9,222,767 of authorised but unissued capital. The new issue will exhaust this balance, and in addition will call for the issue of a very small part of the new capital to be authorised. The rest will remain in reserve. [This statement was issued before the annual meeting. More precise details of the arrangements appear in our editorial notes.]

Gas-Heated Furnaces

Their Design and Operation

THE members of the Birmingham and Midland Section of the Society of Chemical Industry received a visit on Friday, April 12, from the Chemical Engineering Group, whose headquarters are in London. A joint meeting and dinner were arranged. In the afternoon, a visit was paid to the metal works of Henry Wiggin and Co., Ltd.

The joint meeting was held at the Engineers' Club, Waterloo Street, Birmingham, and there was a representative attendance of members of the two organisations and of gas engineers from Birmingham and the Midlands. The Chairman was Mr. W. A. S. Calder (Society of Chemical Industry), and he was supported by Mr. H. Talbor (chairman of the Chemical Engineering Group), Mr. W. J. A. Butterfield (chairman of the London Section of the Society of Chemical Industry), and Mr. C. S. Garland (vice-president of the Institution of Chemical Engineers).

Dr. C. M. Walter (head of the Industrial Research Department of the Birmingham Gas Department) delivered a paper on "The Design and Operation of Gas-Heated Furnaces." The first essential for the efficient working of any gas furnace was that the combustion should be as complete and perfect as practically possible, that is, the amount of air used for the combustion of the gas must be as near the theoretical quantity as possible; also, it was of the utmost importance that the mixture of the gas and air prior to combustion should be as complete as possible, otherwise the excess of air required to complete the combustion would be increased, with consequent reduction of flame temperature.

Bearing in mind that the efficiency maximum flame temperature which was possible from the combustion of any fuel corresponded to the temperature to which the products of combustion would be raised if the whole of the heat evolved was transferred to the products, the results consequent on the dilution of the products with excess air would be at once apparent. In the case of direct-fired furnaces utilising solid fuel, the very low figures of efficiency obtained were almost entirely due to the very considerable amount of excess air necessary to bring about complete combustion of the fuel; in some cases, this amounted to 300 or 400 per cent.

In order, therefore, to reduce furnace losses to a minimum, it was most essential that provision be made to enable the air necessary for combustion to be controlled within flue limits, by arranging for suitable damper control, thus preventing undue dilution of products by excess air. With regard to other losses, including losses by radiation and convection, these could only be cut down by paying every attention to the lagging of the outside walls and providing well-fitting doors.

Discussion

Mr. Butterfield, discussing the paper, said he was informed that in Sheffield the producer gas plant which was formerly used in many works was being allowed to become derelict because firms preferred to take their fuel gas direct from the town mains. He had been struck more and more with the extent to which coal gas was being applied to industries, and he believed its application in Birmingham, Coventry and elsewhere was equal to that in Sheffield.

Mr. W. A. Benton suggested that furnaces would have much greater application if more scientific regard was had for the construction of many of them. Regenerative or recuperative plants were often of the crudest description, and he felt that the makers were behind the makers of electrical furnaces in those respects.

Dr. Walters, replying on the discussion, declared that for ordinary heat-treatment operations, towns gas would eventually be the fuel, although he agreed that, with regard to the high-temperature smelting operations in the production of steel, electric smelting was probably the better.

Oil Shales of Palestine

DR. BORIS KAZMANN, of Rehoboth, Palestine, is in the United States in connection with the proposed development of the oil-shale resources of that country. Dr. Kazmann has conferred with the United States Department of Commerce for the purpose of obtaining information on the oil-shale retorting work of the United States Bureau of Mines. He is making extended experiments in Palestine, with a view to developing methods of extracting oils from the lime-shales found there.

Chemical Notes from Westminster

Questions in the House

The Gallery, Westminster.

IN the discussion on Mr. Churchill's Budget speech (April 15), Lt.-Commander Kenworthy twice attempted to raise a point as to the duty of fourpence a gallon on turpentine, but was ruled out of order on each occasion. He was, however, able to state the fact that the turpentine duty had caused grave disabilities on a large body of manufacturers who used the vegetable oil as a raw material in the manufacture of goods. The tax had produced £100,000, but the users interested had recently sent to the Treasury a large number of resolutions asking for its abolition or for a rebate. Was there any hope of such a concession being granted? Unfortunately the Chancellor of the Exchequer had not referred to the matter, and he asked the Financial Secretary to make a statement. At this point Lt.-Commander Kenworthy was "cut short" by both the Chairman of Committees and by the Speaker.

Mr. Churchill (April 16) announced that, as recommended by the Radium Committee, the Government would be prepared to contribute pound for pound up to a maximum of £100,000 to a fund of £200,000 to be raised by public appeal for the purchase of 20 grammes of radium for use in the hospitals of Great Britain. The Government also accepted in principle the recommendation of the Committee that an organisation should be set up to raise the fund, purchase the radium and distribute it. Mr. Ramsay MacDonald asked whether the Government had considered the effect of this announcement on the price of radium, and did they propose to take any steps to safeguard themselves in that respect? Mr. Churchill said that the matter was dealt with in the Committee's report. Commander Bellairs hoped that the international aspect of the radium question would not be lost sight of, and that it would (especially with regard to the Belgian monopoly in the Congo area) be brought before the League of Nations.

In the House of Lords (April 16) the Earl of Plymouth (under-Secretary, Dominion Affairs), in answer to Viscount Templetown, stated that the Executive Committee of the Palestine Arab Congress had been informed that the extraction of salts from the Dead Sea was of such a technical and speculative character that it was not suitable for Government development. The Palestine Trans-Jordan Government had decided, in principle, to grant the concession to Major Tulloch and Mr. Novomeysky, provided suitable terms and conditions could be agreed upon and that satisfactory financial guarantees could be furnished.

The Dyestuff Development Report

ALTHOUGH it is understood (the London Correspondent of the *Manchester Guardian* states) that the Dyestuffs Development Committee has under consideration a comprehensive report on the working of the Dyestuffs (Import Regulation) Act of 1920, I doubt if such a report will be available for some time to come. This Act, under which foreign dyestuffs are only admitted into this country under licence, was passed to run for ten years, "and no longer." The period expires on January 15, 1931, over eighteen months hence.

The report on the operation of the Act will naturally involve the tabulation of an enormous mass of statistics and the consideration of its effects from several conflicting angles, and if it appeared six months hence it would still be well in front of the expiration date. I cannot discover any likelihood of its appearance much earlier than that.

The Dyestuffs Development Committee is, of course, quite distinct from the Dyestuffs Licensing Committee. One of its best-known members, Mr. Sutcliffe Smith, of Bradford, representing the interests of the colour-users, has repeatedly pressed for a lower price factor, and even hinted that at the expiration of the ten years the Act should not be renewed at all. In view, however, of opposition from the manufacturers, Mr. Smith has strongly urged that a conference be held of all the interests concerned with the object of agreeing on a joint recommendation to the Government.

Works Fire Brigades

An Account of their Organisation

A CONFERENCE on the work and organisation of works fire brigades was held recently, organised by the Association of Liquid Chemical Fire Extinguisher Manufacturers, at the hall of the Institution of Mechanical Engineers, London. A large number of those prominently interested in the question of fire protection attended, including Messrs. E. C. Desborough (Air Ministry), W. G. Webster (National Fire Brigades Association), J. F. Jessop (London Private Fire Brigades Association), J. W. Dane (Croydon Fire Brigade), and F. J. Bevis (Hendon Fire Brigade), together with representatives from railway, oil and insurance companies, and representatives from many of the largest industrial concerns and municipalities. Mr. A. E. Wiseman, chairman of the council of the Association, presided, and was supported by members of the council.

Fire Prevention and Protection

In the course of his opening remarks, the chairman stated that the conference was being held in response to many requests following the public meeting organised by the Association in December last, and expressed gratification at the large and representative character of the meeting. He stated that as the subject of fire prevention was being very widely discussed, he made no apology for calling the conference together to discuss the very closely allied subject of fire protection. Everyone believed in fire prevention as the basic principle upon which to build our ideas for effectively combating our tremendous fire losses, but while everything should be done to make our buildings fireproof and to encourage fire-preventive methods in all directions, the human element, involving error of judgment, carelessness, and the familiarity that bred contempt of danger, still had to be reckoned with, and at that point it was necessary to consider organisation for fire protection. He was careful to emphasise that every possible assistance should be given to those who were investigating and putting into practice methods for the prevention of fire, but at the same time it was necessary that there should be no relaxation of effort to improve the equipment and facilities for fire protection; indeed, the one was the complement of the other.

The Kodak Works Organisation

Mr. F. B. Willis, chief officer of the fire brigade of Kodak, Ltd., gave an account of the work and organisation of his brigade. He stated that it was not only their duty to be efficient in extinguishing fires, but also to see that possible causes of fire were as far as possible eliminated. At his factory it was looked upon as an unpardonable offence to allow rubbish to accumulate. He described the very interesting scheme by which any of their buildings could be cleared of workers in case of an outbreak of fire, which scheme incidentally embodied simultaneous action for extinguishing the fire.

In factories, hotels and other similar premises equipped with fire hydrants and hand extinguishers, the training of the staff to take action in case of fire should be under the supervision, preferably, of an ex-fire brigade officer. Drills should take place periodically, say once a month, and the staff, or a selected number of them, should be instructed in the use of appliances installed on the premises and the specific duties to be undertaken by each individual, not only for the extinction of fire, but also for the purpose of clearing the building and organising means of escape. Fire hose should be run out and occasional wet drills should be performed where this was practicable, to permit those concerned to become accustomed to handling the hose and branches under pressure. A certain number of hand extinguishers should also be discharged periodically in rotation. This not only familiarised the staff with the best method of using the extinguishers but had the additional advantage of maintaining the extinguishers in thorough working order.

In cases where the equipment necessary for the protection of the premises only consisted of a number of hand fire extinguishers, it was still of the utmost importance that some definite plan of action should be arranged and practised, so that it could be put into action automatically directly an outbreak of fire occurred. A member of the staff should be appointed as fireman. His duties should include responsibility for the maintenance of fire extinguishers by means of periodical inspection and testing. He should keep records embodying details of the testing and examination of each extinguisher. He should also select one or more of the employees from each department or section of the building and instruct and train them in the use of the extinguishers, giving them specific duties to carry out in an emergency.

In all premises there should be a recognised signal for the alarm to be given in case of fire. The fireman should arrange periodical fire drill, giving the alarm, and assembling his staff with the extinguishers. In cases where fire escapes of the chute or ladder type were provided, the staff should have some regular practice in their use from time to time.

Mr. A. W. Cook (a member of the council of the Association) stated that the fire loss for last year was £10,628,474, an increase of £2,800,000 on the figure for 1927. He pointed out that the most effective way to combat the growing menace of fire was to be adequately prepared to attack an outbreak at the start. Hand chemical fire extinguishers should be available in carefully selected positions for instant use. Many fires had thus been stopped at the outset. He very emphatically advised that, coincident with the use of hand extinguishers, the local fire brigade should be informed by telephone and proper action taken to be in readiness to attack the fire with other types of equipment.

Acid Colours for Wool

Tests for Levelling Properties

UNDER the auspices of the London Section of the Society of Dyers and Colourists a meeting was held at Luton last week, when Mr. W. E. Fearnsides (of L. B. Holliday and Co., Ltd.), lectured on acid colours and tests for the levelling properties on wool.

Wool dyers, he said, had long recognised in practice that the acid dyestuffs varied to an extraordinary degree in the ease with which they could be dyed level on wool textiles. Some were so difficult to apply, owing to their tendency to flush on, unless the acidity of the dye bath was reduced to a minimum, or from a total failure to level up at the boil, that many experienced dyers were avoiding them altogether. They preferred to use dyestuffs that could be salted at the boil. While the range of acid dyestuffs commonly in use was pretty well-known with regard to the question of level dyeing, there did not seem to be a laboratory test which was satisfactory in every respect, or which conformed fully to dyehouse experience. It was desirable, therefore, that some suitable series of tests should be agreed on and standardised as far as levelling properties were concerned.

The usual test of boiling the dyed pattern in company with an undyed piece of wool in a bath containing Glauber's salt and sulphuric acid, and noting the degree to which the dyestuff was transferred from the dyed to the undyed piece of wool, was only satisfactory up to a certain point. Examples might be adduced of colours which were equivalent as far as that test showed, but which differed pretty widely in their actual levelling properties. It had, therefore, been found necessary to supplement the boiling test by an acid solubility test, where the dyestuff was boiled for ten minutes in an acidulated bath and filtered, and in other cases tests had been made to compare the speed with which the dyestuff was absorbed by the fibre.

It had, however, occurred to the speaker's firm that there might be an analogy between the dyeing of wool with levelling acid colours and the dyeing of viscose silk with substantive colours, and that a time and temperature test might afford equally instructive results in wool dyeing. They, therefore, prepared a series of identical dyebaths for each dyestuff, using one-half per cent. of standard dyestuff, 10 per cent. of Glauber's salt, and 1½ per cent. of sulphuric acid, and dyed the same weight of wool for the same time in each dye-bath, but at temperatures ranging from cold to boiling. The result was to show that, just as in viscose silk dyeing, those substantive dyes were best which showed considerable affintiy even at low temperatures and a lessened affinity at the boil, compared with the temperature at 90° C. The best levelling dyestuffs showed considerable affinity, even at 30° C., which rose gradually up to a temperature of 90° C. Speaking generally, it could be said that dyestuffs with unsatisfactory levelling properties showed no affinity in the cold, with a more or less steep rise in affinity up to the boiling point.

Dyestuff Director's Visit to Russia

An Unfavourable Report

MR. CHARLES K. CROSLAND, a director of L. B. Holliday and Co., dye manufacturers, of Deighton, Huddersfield, has returned home after visiting Moscow with the members of the British Trade Delegation. In an interview on Monday with a *Yorkshire Post* correspondent, he said that the delegation had been told that the Russians were prepared to give orders for £160,000,000 worth of goods within the next five years, and were anxious that the British manufacturers should have the trade. The offer was dependent upon the recognition of the Soviet Republic by the British Government. The delegates were not informed as to how the Russians proposed to pay for these goods, but the financial aspect of the matter would be investigated by an economic committee, who would later present a report.

From what he saw he formed the opinion that there was very little export trade from Russia, although the Republican authorities were trying to get the peasants to work and so to develop export trade. It was his opinion that many of the things that were being exported were really needed by the Russian people themselves, and he did not see how the money was to be found for the goods required. The suggested orders were to be largely for textile machinery and for machinery for manufacturing rubber tyres and small goods. He had come to the conclusion that there was a very great need for clothing, and if anyone could get large quantities of ready-made clothing into the country, there was an excellent market for it.

The members of the delegation were allowed to go wherever they wished in Moscow, and he never saw a well-dressed person. Everything in the city was State-owned, and there was practically nothing in the shops. There were a few mills that contained good machinery, but they were not worked efficiently. During the last two years the Germans had done a very large trade with Russia, and he could not help thinking that the Russians had about exhausted their credit with Germany, and were now turning to this country for that reason. There was no evidence of wealth in Moscow, so far as he could ascertain, and in a city of 2½ million inhabitants there were only 100 motor-cars.

The Marketing of Chile Nitrate

A MEETING of the Chilean Nitrate Producers recently held in Chile approved of the new Statutes of the Nitrate Producers' Association, which will become effective on July 1 next and will be in force for a period of 10 years. The principal clause in the Statutes is No. 7, which includes a paragraph to the effect that, with the vote of 75 per cent. of the directors present, the board may resolve that sales in one or more consuming markets, or in any markets which are not expressly excluded, may be made through the Association direct, or through the intermediary of the enterprise which is appointed for the purpose, and the board will fix the rules which shall be applicable in such cases. A statement was made at the meeting on behalf of the Chilean Government. It was to the effect that, on the occasion of the renewal for 10 years of the Nitrate Producers' Association, the Chilean Government, satisfied with the excellent results of the year 1928, in which substantial progress had been made in production, as well as in sales of nitrate, and appreciating the unhesitating collaboration of the producers in the organisation of sales, emphasised that it would spare no effort to aid the nitrate industry to increase still further its production and extend its markets, and that, in order to further its policy it would make use for the benefit of the industry of the full powers conferred upon it by the Nitrate Law. Following upon this statement it was officially announced that the Minister of Finance, accompanied by the Superintendent of Nitrate and the Chief of the Budget Department, would proceed to Europe to study personally the present position and future prospects of the markets for Chilean nitrate.

Rayon in Italy

FOUR ITALIAN ARTIFICIAL SILK MANUFACTURERS, the Soie de Chatillon of Turin, the Snia Viscosa, the Varedo company, and the Società Generale, have come to an understanding with regard to production and sales of viscose (acetate silk is not affected).

Railroads and Chemical Industry

Results of American Liaison

SINCE the eleventh Exposition of Chemical Industries was held in New York City in the fall of 1927 many new processes have been developed with much new machinery and equipment for use in the chemical and allied industries. These new practices and processes have done much toward increasing the uses and markets, both domestic and foreign, for raw and finished products, along with the most advanced methods of handling. The country is fully awake to the greatness of the industry and sections of the country are constantly making bids for various branches of the latter. The railroads in some sections maintain specialists in their industrial bureaux who study the trend of the chemical industry from the standpoint of production from raw to finished products and the markets for these products. This is done with the idea of locating industry on the railroad line and while done from a purely selfish motive, this research is of much benefit to the nation and industry as a whole and has helped to cement a stronger foundation for the chemical industry, which the railroads have been quick to take advantage of for developing resources along their lines.

As an aspect of this it is interesting to note that a number of railroads will be represented at the twelfth Exposition of Chemical Industries which will be held at Grand Central Palace, New York City, the week of May 6, 1929. The exposition will draw chemists, chemical engineers, manufacturers and others interested, from some forty industries which are dependent in their operations upon chemical changes in the material or are under chemical control. Many new products as well as equipment will be shown for the first time. The interest manifested at this early date indicates a greater number of exhibitors than ever before in the history of the exposition. One of the most important dates will be Export Day, May 9, when the exhibitors will be especially prepared to meet foreign visitors and to discuss with them their products in detail and the problems of the foreign representatives.

A Criticism of Railway Staffs

CRITICISM of railway staffs was made by Mr. Andrew Hastie, traffic superintendent of Synthetic Ammonia and Nitrates, Ltd., of Billingham, in a paper on "Works Traffic Problems," read to the Industrial Transport Association in London recently. "The general experience among traffic managers," he said, "is that the officials—especially the lower grades—cannot shake off the old traditions, and have no sense of courtesy or service. Salesmanship is not in the category of many of the railway staffs. The snappy ticket collector, the indifferent booking-clerk, or the unconcerned agent are met from day to day. By coming into contact with hard economic realities, the railway companies are undoubtedly trying hard to put their house in order. The country cannot allow its railways to become inefficient or obsolete transport units through lack of support. The railway companies need a new education of the rank and file, and the introduction of business brains into the service. Live 'salesmen,' or 'solicitors,' as they are called in America, must be called in to save the situation. The railway companies have a commodity to sell. Traffic managers are waiting to buy transport."

Appointments Vacant

FELLOWSHIPS of the Salters' Institute of Industrial Chemistry. Details are given in our advertisement columns, p. xxiii.

GRANTS-IN-AID for young men and women employed in chemical works in or near London who desire to extend their education for a career in chemical industry. Details are given in our advertisement columns, p. xxiii.

FELLOWSHIP of the Institution of Petroleum Technologists for research on petroleum problems. Details are given in our advertisement columns, p. xxiii.

JUNIOR CHEMIST, London district. Details are given in our advertisement columns, p. xxiv.

DEMONSTRATOR in inorganic and physical chemistry in Bedford College for Women, University of London. May 4. The Secretary, Bedford College for Women, Regents Park, London, N.W.1.

ASSISTANT CHEMIST for analytical work in mineral chemical laboratory. Details are given in our advertisement columns, p. xxiv.

From Week to Week

AN ULTRAMARINE FACTORY is being erected at Rostow, Russia. One factory is already in existence at Leningrad.

THE COMPANIA SALITRERA AGUA SANTA have acquired the Antonia nitrate field for the sum of £360,000, states a message from Valparaiso.

THE RADIUM FIELDS at Mount Painter, Australia, are being examined, and it is understood that extensive developments are contemplated.

MR. J. C. BUDD and Mr. W. Mure have been elected to seats on the board of the British Metals Corporation, and have been appointed joint managing directors.

THE AMERICAN CYANAMID CO., of New York, in purchasing the Calco Chemical Co., has, as a purchase consideration, transferred ordinary shares to the value of $6,375,000.

MISS M. G. COCK, of Brunner Mond and Co. (Imperial Chemical Industries), contributes to the current number of *Industrial Welfare* an interesting article on "Canteen Economy."

RECENT WILLS INCLUDE:—Mr. Thomas Porter Blunt, M.A., F.I.C., formerly public analyst for Shropshire, Merionethshire, and Montgomeryshire (net personalty £2,160), £6,623.

THE PRODUCTION OF TUNISIAN PHOSPHATE for 1928 showed a decrease of slightly more than 9 per cent. as compared with the previous year. Phosphate production in Tunis during 1926, 1927 and 1928 was, 2,564,000 metric tons, 3,075,000 tons, and 2,789,000 tons respectively.

MR. F. ROWLINSON, at present publicity manager to Mather and Platt, Ltd., Manchester, is shortly to take over the establishment of a publicity department for the United Steel Companies, Ltd., Sheffield, the large "vertical" group controlling the merger of steel and allied industrial firms.

WOOD-PRESERVING properties are attributed to zinc meta-arsenite. It is insoluble in water, which prevents it from being washed out, and has a strong toxic action towards wood-destructive insects and fungi. It rapidly permeates wood, and does not attack iron and steel. It is said to be 30 times as toxic as creosote.

THE HEXAHYRIC ALCOHOL *d*-SORBITOL, corresponding to the sugar glucose, is being marketed by the I.G. Farbenindustrie A.-G. as a sugar-substitute, under the name "Sionon." A favourable account of its action is given by A. Reinwein (of the medical clinic of the University of Würzburg) in the Deutsche *Medizinische Wochenschrift*, p. 397.

THE NEW DEPARTMENT OF MINING at Armstrong College, Newcastle, is to be opened by the Prince of Wales on May 14. It will cost £45,000 when completed and will be one of the finest of its kind. A complete course of training will be provided for mine workers, and intensive research work will be carried out in connection with fuel survey under the Fuel Research Board.

THE NAME "CHARDONE" has been officially adopted in France for artificial silk, the term "soie artificielle" having been used hitherto. A note in the German journal *Die Metallbörse* states that the term "rayon" is gaining favour in Anglo-Saxon countries, and only in Germany does a misnomer still persist, i.e., "Kunstseide," the name "Glanzstoff" not having received approval. The German journal suggests for use in Germany the name "Pflanzenseide" (plant or vegetable silk).

THE GERMAN POTASH SYNDICATE will shortly send two members of its technical staff to assist the Russians in the exploitation of the potash deposits at Solikamsk. It has been suggested that the Syndicate may actually take a financial interest in the Russian undertaking, but it seems doubtful if the Russians would agree to this. The Russians have been unfortunate in their own work, as their shaft has, for the second time, collapsed. As, moreover, the railway connection with Solikamsk has not been made, prospects are still rather hazy.

CHEMICAL AND WOOD INDUSTRIES will advertise, on Monday, April 22, particulars of an issue at par of 725,000 shares of £1 each, but the subscriptions lists will not open until the following day. The main object of the company is to acquire a controlling interest in the Wood Distillation Co., and to develop that undertaking's chemical works and timber concessions in Bosnia, Jugoslavia. The Government of that country is interested in the distillation company. An artificial silk factory is to be erected, and considerable profits are anticipated from the company's brown coal mines.

MR. J. F. LIVERSEEGE, F.I.C., who has recently retired from the service of the Birmingham Corporation, was the recipient, on Friday, April 12, of a presentation from members (past and present) of the Birmingham Public Health Committee. Mr. Liverseege served the Corporation for forty-four years, the last twenty-seven as City Analyst. The presentation was made by the Lord Mayor (Alderman W. Bying Kenrick), and consisted of an oak bookcase and an engrossed copy of a resolution. The latter recorded appreciation of Mr. Liverseege's excellent services, and regret at their loss.

THE LEAGUE OF NATIONS convention forbidding the use of poison gas has been ratified by the Jugo-Slav Government.

THE AUSTRALIAN ALUM WORKS in the Runcorn district have been closed down, and taken over by a neighbouring concern.

DR. A. W. GROVES has been appointed by the Secretary of State for the Colonies to be assistant chemist and petrologist in Uganda.

LORD MELCHETT has presented a beautiful seventeenth century doorway and a carved deal staircase to the Geffrye Museum in Bethnal Green.

THE CELLULOSE MANUFACTURERS OF SWEDEN, Norway and Finland are said to have made an agreement foreshadowing control of deliveries and prices.

IT IS REPORTED from Sao Paulo that five persons have been killed and eight injured in an explosion at a chemical factory. The damage is estimated at $25,000.

CANADIAN INDUSTRIES, LTD., will, in the near future, erect a sulphuric acid plant at Copper Cliff, Ontario, at an estimated cost of $1,500,000, to manufacture acid on a fairly large scale.

A NEW COMPANY, to be known as Zinc Manufacturers, is to be launched under the auspices of the N.C. Metal Co. It is understood that an issue of 750,000 "A" shares of 10s. is shortly to be made.

JUGOSLAVIAN PRODUCTION OF CARBIDE in 1928 amounted to 900 wagons, and of cyanamide to 7,500 wagons. The total exports of both amounted to 4,246 wagons, of a value of 125 million dinars.

MR. ARTHUR LADENBURG has resigned from the board of Einstein's Electro Chemical Process, owing to pressure of other interests and inability to give sufficient time and attention to the affairs of the company.

THE UNOFFICIAL DISCUSSIONS in Berlin between German and Czechoslovakian dye interests are now to be resumed officially in Prague. The use of German licences in Czechoslovakia is in question, and it is planned to establish a company in which the Czechoslovakian textile industry will also participate.

AT A MEETING of the Public Health Committee of Aberdeen Town Council on Wednesday, April 10, it was intimated that the Department of Health had approved of the application of the Mutual Fish Products Co. for permission to erect a fish meal factory in the city, subject to two readjustments of the plan.

THE NORSK HYDRO COMPANY has just brought into operation the essential part of the new plant begun eighteen months ago at Rjuken and Heroen. When the whole of the new plant is in operation, the company will have an annual output of 450,000 tons of nitrogenous fertilisers, corresponding to 80,000-100,000 tons of nitrogen. The cost of the recent developments is estimated at 70 to 80 million kroner.

THE NEW ZEALAND off-shoot of Imperial Chemical Industries is engaged in preliminary work in connection with the exploitation of valuable deposits of cinnabar near Kaikohe, North Auckland. The erection of buildings and machinery is reported to be proceeding apace and the company expects to be ready to commence operations in three months' time. The mercury products of the enterprise will be despatched direct to England.

LADY BENN is giving on April 30 an evening "At Home" at the John Benn Hostel at Stepney. Lady Bertha Dawkins has consented to be the guest of honour, and will speak on the boys' hostel and the community centre. The guests will be received by Lady Benn and the members of the Council of the East End Hostels Association, will be given light refreshments, and will then be conducted by the dormitory leaders round the whole institution.

THE DIRECTORS of International Bitumen Emulsions state that it has apparently been assumed from the circular of March 21, dealing with arrangement with Standard Oil of California and the formation of a new company, that the Standard Oil Co.'s contribution to the new capital is to be subscribed immediately. This, however, is not the case, as the Standard Co. will subscribe up to £340,000 only as and when required, and the capital of the new company will consist only of money which can be usefully employed in the company's business. An agreement has been arrived at for the acquisition of an 80 per cent. controlling interest in the American manufacturing company.

Obituary

ULYSSE GAYON, a pupil of Pasteur, honorary doyen of the Faculty of Sciences at Bordeaux, aged 82.

MR. HAROLD JOSEPH HAILSTONE, Assoc.M.I.Chem.E., manager of the tar and ammonia works of the Rochdale Corporation. In 1923, he was awarded the first prize offered by the National Gas Exhibition.

MR. SAMUEL MONTAGUE SHADBOLT, Assoc. M.I.Chem.E. manager of the Stella Gill Coke Oven and By-Products Works of the Mid-Durham Carbonisation Co. His death was due to an accident on the day on which he took up this position. He was formerly associated with Chemical Engineering and Wilson's Patent Furnace Co.

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United States

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GENERAL.—The toxic properties of sulphur. R. C. Williams and H. C. Young. *Ind. Eng. Chem.*, April 1, pp. 359–362. Ordinary pure commercial sulphur for fungicidal purposes has associated with it sulphurous acid, suphuric acid, and pentathionic acid (tetrathionic acid). A study has been made of the chemical and fungicidal properties of the acids of sulphur that are either associated with sulphur or are quite commonly known, and it has been found that the most toxic to spores of *S. cinerea* are the polythionic acids. Sulphur freed from this type of acid is not toxic.

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Organo-mercury compounds. II.—A new method for the preparation of symmetrical aromatic organo-mercury compounds. A. N. Nesmejanow and E. J. Kahn. *Berichte*, April 3, pp. 1018–1020. Symmetrical aromatic organic compounds (e.g., Ar_2Hg) are formed by the action of copper powder on the double salts formed from diazonium halides and mercuric halides in the presence of acetone (or alcohol) and ammonia.

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Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

307,723 and 307,947. VAT DYESTUFFS, MANUFACTURE OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application dates, December 10 and September 12, 1927, and March 16 and 19, 1928.

307,723. Vat dyestuffs are obtained by treating 2-benzanthronyl-1¹-amino-anthraquinones, *i.e.*, benzanthrones which contain an α-anthraquinonyl-amino radicle in the 2-position which contain one further anthraquinonyl radicle attached to the benzanthronyl radicle by means of a NH group, with alkaline condensing agents at 230°–300° C. The products give black dyeings of great fastness, and several examples are given.

307,947. Vat dyestuffs are obtained by condensing one molecular proportion of a mono- or poly-nuclear isocyclic or hetero-cyclic compound containing in the nucleus two or more negative substituents with two or more molecular proportions of a nitrogenous dibenzanthrone or isodibenzanthrone or a derivative containing at least one reactive hydrogen atom attached to the nitrogen atom. The negatively substituted compounds may be derived from benzene, naphthalene, anthracene, phenanthrene, perylene, pyrene, dibenzpyrene, anthanthrone, pyranthrone, ms-benzdianthrone, ms-naphthodianthrone, ms-anthradianthrone, allo-ms-naphthodianthrone, anthraquinone, anthraquinone-acridone, indigo, thioindigo, etc. Vat dyestuffs may also be obtained by condensing an aromatic or hetero-cyclic compound containing one or more negative substituents in the nucleus but other than a pyranthrone, with one molecular proportion of a nitrogenous dibenzanthrone or isodibenzanthrone, or a derivative containing at least one reactive hydrogen atom on the nitrogen atom. In the case of poly-negatively substituted mono-nuclear heterocyclic compounds, the whole or only part of the negative substituents may be replaced by the nitrogenous dibenzanthrone or isodibenzanthrone radicle. The reactive negative groups remaining may be replaced by radicles of other components such as amino-anthraquinones or other aliphatic or aromatic amines or alcohols, or phenols or thiophenols. Examples are given. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts of 1907–1928, to Specification No. 26,551/1912.

307,727. 6-ALKOXY-8-AMINO-QUINOLINES, MANUFACTURE OF. I.G. Farbenindustrie Akt.-Ges, Frankfort-on-Main, Germany, and A. Carpmael, London. Application date, December 12, 1927. Addition to 267,457.

Specification No. 267,457 (see THE CHEMICAL AGE, Vol. XVI, p. 401), describes the manufacture of 6-methoxy-(and ethoxy-) 8-nitroquinoline by heating *o*-nitro- *p*-anisidine or *o*-nitro-*p*-phenetidine, arsenic acid, glycerine, and sulphuric acid, and reduction to the amino compounds. In this invention, 6-alkoxy-quinoline-8-carboxylic acid amides are subjected to the Hoffmann decomposition. This substance (the preparation of which is described) is treated with a solution of bromine and caustic potash, and is then heated with caustic soda solution. An oil separates and is extracted with ether.

307,728. COMPOUNDS CONTAINING SULPHUR, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 12, 1927.

These compounds are obtained by treating alicyclic secondary amines with carbon disulphide. The treatment may be effected in the presence of other organic or inorganic bases, or basic oxides or hydroxides. New dithio-carbamic acids and dithio-carbamates are obtained by treating secondary bases of alicyclic compounds with carbon disulphide, the alicyclic secondary amine acting as the cation. When the treatment is effected in the presence of other organic or inorganic bases or basic oxides or hydroxides, other salts of these alicyclic dithiocarbamic acids are obtained. Examples are given.

307,778. CYANIDES, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 13, 1927.

Cyanates are converted quantitatively into cyanides by treating with carbon monoxide at a temperature of 700° C. or more. An indifferent diluent such as graphite or magnesia may be present.

307,808. ARTIFICIAL RUBBER, MANUFACTURE OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 12, 1927.

Methane obtained from coal or by cracking organic compounds is converted into acetylene by passing through a flaming electric arc, and the acetylene is converted by treating with a sulphuric acid solution of a mercury salt into acetaldehyde, which is distilled off. The acetaldehyde is then treated with dilute alkali to obtain aldol, which is then treated with hydrogen at 100° C. and pressure of 100 atmospheres to obtain 1 : 3-butylene-glycol. This is treated with phosphorus pentoxide or catalysts capable of splitting off water to obtain butadiene, which is then polymerised to obtain plastic products, which when vulcanised are similar to vulcanised rubber. The above method of obtaining the acetylene avoids the presence of impurities deleterious to the subsequent reaction.

307,946. HYDROCARBONS, ESPECIALLY THOSE OF LOW BOILING POINT, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 12, 1927.

In the catalytic production of hydrocarbons of low boiling point from coal, tar, mineral oils, their distillation and extraction products and residues, by heating to a high temperature with hydrogen, the catalyst consists of oxides of metals or metalloids from groups 3–7 of the periodic system such as uranium oxide, vanadium oxide, chromic acid, manganese oxide, molybdenum oxide, or boric oxide, deposited on aluminium, silver, manganese, chromium, or chromium-nickel alloy, in the form of grains, balls, chips, wire, etc. The catalysts are obtained by treating the metal with acidified solutions of the salts of the catalytic elements. The catalysts are suitable for the production of low-boiling products of the benzine type, and also for the production of hydrocarbons by dehydrogenating hydrocarbons, tar, mineral oils, etc., at a temperature of 550°–650° C. It is possible to convert 80 per cent. of the petroleum fraction boiling above 300° C. into benzines boiling below 200° C., by passing with hydrogen over the catalyst under pressure at 450° C. Examples are given of the treatment of mineral oils, coal tar oils, etc.

307,950. DYESTUFF AND INTERMEDIATES, MANUFACTURE OF. W. Smith, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Stirling. Application date, October 17, 1927.

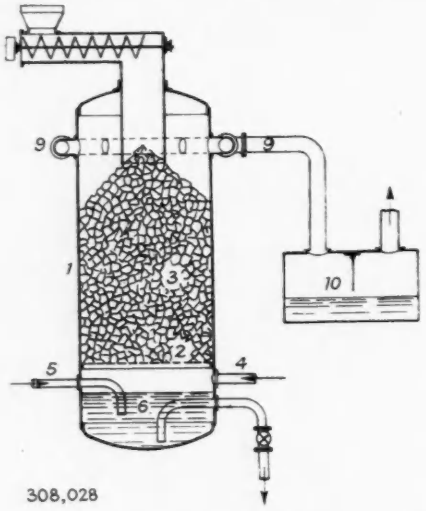
Specification No. 264,916 (see THE CHEMICAL AGE, Vol XVI, p. 262) describes the production of a substantially pure form of 2-amino-3-chloranthraquinone, and it has now been found that this may be condensed with antimony pentachloride in an organic solvent. The solvent may be of an oxidising nature such as nitrobenzene, nitrotoluene, and other solvents containing nitro groups, or the solvent may be non-oxidising, in which case oxidation is effected in the melt, *e.g.*, by nitrogen peroxide. The dyestuff is filtered off, and the filtrate then distilled to obtain the solvent and antimony chloride. Antimony trichloride may be converted into antimony pentachloride for use again by treating with chlorine. The product appears to be 3 : 3¹-dichlor-flavanthrone. This dissolves in alkaline hydrosulphite and the solution dyes deep blue shades which oxidise to orange shades.

308,028. NITRATES, MANUFACTURE OF. J. I. Bronn, 12, Hessenallee, Charlottenburg, Berlin, G. Fischer and Concordia-Bergbau, Akt.-Ges., Oberhaussen, Rheinland, Germany. Application date, January 31, 1928.

Sodium chloride can be converted into nitrate by treating

with nitric acid mixed with steam, and it has been found that the yield in nitrates and the economy of the process depend on the use of a quantity of steam 10–15 times that of the acid. A smaller proportion of steam causes the reaction of nitric acid and hydrochloric acid to form nitrosyl chloride and chlorine.

In an example, an acid proof container 1 is filled with pieces of potassium chloride 3 resting on a perforated plate 2. Steam containing nitric acid is admitted at 4 and slightly superheated steam at 5. Potassium nitrate is formed, and is more soluble



308,028

than the chloride and collects at 6, and is drawn off periodically and crystallised. Steam and hydrochloric acid escape at 9, and the dimensions of the apparatus are such that the vapour is free from nitric acid or oxide. The condensate in the vessel 10 contains about 15 per cent. of hydrochloric acid, and the escaping steam is raised in temperature and used again. Alternatively, a solution of potassium chloride may be treated, in which case the tower is filled with acid-proof material over which the solution passes. A description is given of the treatment of crude potassium chloride.

308,049. Anthraquinone Derivatives, Manufacture of. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, and A. Shepherdson, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, February 15, 1928. Addition to 271,602.

Specification No. 271,602 (see The Chemical Age, Vol. XVII, p. 38) describes the condensation of halogen derivatives of anthraquinone with arylamines, by condensing in the presence of sodium acetate crystals or sodium acetate and water, in which one part of arylamine is used with one part of halogenated anthraquinone and sodium acetate provides the diluent. In this invention potassium acetate is used instead of sodium acetate and higher yields of arylamino-antyraquinones are obtained.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age, when they became open to inspection under the International Convention: 282,107 (I.G. Farbenindustire Akt.-Ges.), relating to azo dyestuffs, see Vol. XVIII, p. 150; 285,873 (Schering Kahlbaum Akt.-Ges.), relating to alkylated guanidine derivatives, see Vol. XVIII, p. 417; 296,074 (Soc. des Usines Chimiques Rhône-Poulenc), relating to potassium manganate, see Vol. XIX, p. 419.

International Specifications not yet Accepted

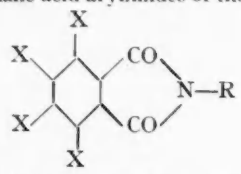
305,589. Synthetic Drugs. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 7, 1928.

A quinoline compound containing a replaceable halogen atom is condensed with an aromatic hydroxy-carboxylic acid or ester to obtain phenoxy-quinoline carboxylic acids and esters, *e.g.*, 2-chlor-quinaldine is heated with *p*-hydroxybenzoic acid methyl ester in nitrobenzene solution. The product may be saponified.

305,592 and 305,593. Dyes and Intermediates. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 7, 1928.

305,592. Indigo dyestuffs are obtained from 1-amino-3 : 6-dimethyl-4-halogen-benzene or 1-amino-2-carboxy-3 : 6-dimethyl-4-halogen-benzene by caustic alkali fusion of the sodium amide of the corresponding phenyl-glycine, or by condensation of the corresponding phenyl-glycine-*o*-carboxylic acid, *e.g.*, by means of acetic anhydride, or by using the phenyl-aminomalonic acid ester method. Some slight modifications are described, and examples are given.

305,593. Phthalic acid arylimides of the general formula



where X represents hydrogen or a monovalent residue, and R represents a substituted or unsubstituted aromatic residue having a free *o*-position to the phthalimide residue, are treated with an acid condensing agent containing chlorine to obtain *o*-(*o*-aminoaroyl)-benzoic acids and inner ring anhydrides.

305,647. Preserving Rubber. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of A. M. Clifford, 649, Honodle Avenue, Akron, Ohio, U.S.A.) International Convention date, February 9, 1928.

Compounds consisting of two hydroxy aromatic molecules combined to form a substance of the type HO—R—R_1—OH, such as β-dinaphthol, are used to improve the ageing qualities of rubber.

305,648. Dyes. J. R. Geigy Soc. Anon., 51, Richenring, Basle, Switzerland. International Convention date, February 9, 1928.

These dyes are made by nitrosating an aminonaphthol or a derivative in which the amino group is replaced by an alkyl-ammonium group or by a group of the general formula —NH—CO—CH_2—N$\equiv$B where B is a basic residue such as

pyridine or a dialkylamine, and X is an acid radicle. Pyridacetyl-2 : 7-aminonaphthol, 2-(dimethyl-aminoacetyl)-amino-7-naphthol, and 2-naphthol-7-trimethyl-ammonium chloride may be treated in this manner, and the metal compounds obtained.

305,931. Sodium Hypochlorite. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 11, 1928.

Waste alkali lyes obtained in making artificial silk are treated with chlorine at ordinary temperature. Sodium hypochlorite is obtained, and organic substances are oxidised to carbon dioxide.

Latest Notifications.

309,116. Process for removing ammonia and sulphuretted hydrogen from gases. Hansen, Dr. C. J. April 5, 1928.
309,118. Preparation of organic peroxides. Straub, J. April 5, 1928.
309,163. Process for manufacturing perylene tetracarbonic acid. Bensa, F. April 6, 1928.
308,969. Process for the manufacture of pearl essence. Paisseau, J. April 2, 1928.
308,980. Manufacture of isatin. I.G. Farbenindustrie Akt.-Ges. March 29, 1928.
309,033. Process for the manufacture of 2-aryl-4 : 6-dihydroxy-pyrimidines. I.G. Farbenindustrie Akt.-Ges. April 3, 1928.
309,038. Apparatus for performing electrometric volumetric analysis. I.G. Farbenindustrie Akt.-Ges. April 3, 1928.
309,042. Process of refining oils or the like. Oranienburger Chemische Fabrik Akt.-Ges. April 3, 1928.
309,047. Process for the manufacture of solid titanyl and titanic sulphates. I.G. Farbenindustrie Akt.-Ges. April 3, 1928.
309,084. Cutting of concave lenses. I.G. Farbenindustrie Akt.-Ges. April 4, 1928.
309,085. Photographic objectives. I.G. Farbenindustrie Akt.-Ges. April 4, 1928.

309,086. Pressure regulator for mechanically pumped liquids. I.G. Farbenindustrie Akt.-Ges. April 4, 1928.

309,087. Manufacture of dyestuffs. Soc. of Chemical Industry in Basle. April 4, 1928.

309,090. Process for the manufacture of concentrated titanyl- and titanic sulphate solutions. I.G. Farbenindustrie Akt.-Ges. April 4, 1928.

309,184. Process for the manufacture of salts of antimonic acid and of derivatives thereof. I.G. Farbenindustrie Akt.-Ges. April 7, 1928.

309,147. Manufacture of viscose. I.G. Farbenindustrie Akt.-Ges. April 5, 1928.

309,148. Process for dyeing or colouring organic compounds, except natural fibres. I.G. Farbenindustrie Akt.-Ges. April 5, 1928.

309,192. Process for the manufacture of dyestuffs of the anthraquinone series. I.G. Farbenindustrie Akt.-Ges. April 7, 1928.

309,193. Process for the manufacture of anthraquinone derivatives. I.G. Farbenindustrie Akt.-Ges. April 7, 1928.

309,194. Process for the production of white or coloured matte effects by printing on cellulose ethers, esters, and transformation products thereof. I.G. Farbenindustrie Akt.-Ges. April 7, 1928.

308,379. Manufacture of vat-dyestuffs. I.G. Farbenindustrie Akt.-Ges. April 7, 1928.

Specifications Accepted with Date of Application

280,522.—Organic compounds containing oxygen, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 15, 1926.

282,365–6. Pure iron and steel, Manufacture of. H. J. Van Royen. December 14 and 15, 1926. 282,366 addition to 282,365.

282,450. 2-amino-naphthalene-3-carboxylic acid and an intermediate compound, Manufacture of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*). December 19, 1927.

282,690. Conversion of natural or artificial inflammable gases into unsaturated hydrocarbons, Process of and apparatus for. Soc. d'Etudes et d'Exploitation des Matières Organiques. December 21, 1926.

282,691 and 283,545. Valuable organic products from solid carbonaceous materials, Recovery of. I.G. Farbenindustrie Akt.-Ges. December 22, 1926, and January 13, 1927. 283,545, addition to 282,691.

283,569. Phenols from tars or tar oils, Process for the removal of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) December 19, 1927.

287,876. Refractory iron alloys. E. O. Vogel and C. F. C. Weichelt. March 28, 1927.

291,043. Absorptive carbon, Process of making. Carbide and Carbon Chemicals Corporation. May 25, 1927.

308,633. Coal and other solid carbonaceous materials, Treatment of, for the production of liquid hydrocarbons or other organic substances. I.G. Farbenindustrie Akt.-Ges. December 21 1927. Addition to 282,691.

308,741. Condensation product from *m*-cresol and acetone, Process for the manufacture of. Shering Kahlbaum Akt.-Ges., and H. Jordan. October 28, 1927. Addition to 273,684.

308,643. Alloys. W. S. Smith, H. J. Garnett, and J. A. Holden. December 23, 1927. Addition to 284,789.

308,859. Ethyl alcohol, Production of. R. E. Slade and Imperial Chemical Industries, Ltd. January 30, 1928.

308,885. Acetone from gases containing the same, Recovery of. W. R. Ormandy. March 14, 1928.

308,906. Triarylmethane dyestuffs. Imperial Chemical Industries, Ltd. E. H. Rodd and F. L. Sharp. April 18, 1928.

308,937. Acetic acid, Production of. H. D. Golding, F. D. Leicester, H. S. Hirst, S. W. Rowell, and Imperial Chemical Industries, Ltd. July 18, 1928.

Applications for Patents

Allchin, L. J., and Imperial Chemical Industries, Ltd. Manufacture of *m*-2-xylidine. 11,288. April 11.

Bader, W., British Celanese, Ltd., and Thomas, E. B. Production of oxygenated organic compounds. 11,362. April 12.

Brightman, R., and Imperial Chemical Industries, Ltd. Azo dyestuffs. 11,289. April 11.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of aromatic amino sulpho chlorides. 11,133. April 10.

Carpmael, A. Manufacture of β-naphthylaminioaryl hydroxy fatty acids. 11,134. April 10.

Carpmael, A. Acceleration of vulcanisation. 11,246. April 11.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo-dyestuffs. 11,374. April 12.

I.G. Farbenindustrie Akt.-Ges. Manufacture of isatin. 10,208. April 2. (Germany, March 29, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of 2-aryl-4.6-dihydroxypyrimidines. 10,217. April 2. (Germany, April 3, 1928).

I.G. Farbenindustrie Akt.-Ges. Apparatus for performing electrometrical volumetric analysis. 10,306. April 3. (Germany, April 3, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of water-resistant heads, etc., for matches. 10,323. April 3. (Germany, July 3, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of solid titanyl and titanic sulphates. 10,383. April 3. (Germany, April 3, 1928.)

I.G. Farbenindustrie Akt.-Ges. Cutting concave lenses. 10,472. April 4. (Germany, April 4, 1928.)

I.G. Farbenindustrie Akt.-Ges. Photographic objectives. 10,473. April 4. (Germany, April 4, 1928.)

I.G. Farbenindustrie Akt.-Ges. Pressure regulator for mechanically pumped liquids. 10,474. April 4. (Germany, April 4, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of concentrated titanyl-titanic sulphate solutions. 10,503. April 4. (Germany, April 4, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of salts of antimonic acid, etc. 10,570. April 5. (Germany, April 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of viscose. 10,594. April 5. (Germany, April 5, 1928.)

I.G. Farbenindustrie Akt.-Ges. Dyeing organic compounds. 10,598. April 5. (Germany, April 5, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs. 10,704. April 6. (Germany, April 7, 1928.)

I.G. Farbenindustrie. Manufacture of anthraquinone derivatives 10,705. April 6. (Germany, April 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Production of matte effects by printing on cellulose ethers, etc. 10,706. April 6. (Germany, April 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of hydrogen. 10,805. April 8.

I.G. Farbenindustrie Akt.-Ges. Separation of ammonia from gas mixtures. 10,806. April 8.

I.G. Farbenindustrie Akt.-Ges. Manufacture of water-soluble fertilisers. 10,807. April 8.

I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products. 10,808. April 8.

I.G. Farbenindustrie Akt.-Ges. Manufacture of catalysts. 10,809. April 8.

I.G. Farbenindustrie Akt.-Ges. Manufacture of aldehydes from alcohols. 11,233. April 11.

I.G. Farbenindustrie Akt.-Ges. Recovery of products of destructive hydrogenation. 11,234. April 11.

I.G. Farbenindustrie Akt.-Ges. Apparatus for separation of gas mixtures. 11,235. April 11.

I.G. Farbenindustrie Akt.-Ges. Production of acetone from acetylene. 11,468. April 13.

I.G. Farbenindustrie Akt.-Ges. Hydrocarbons, etc. 10,804. April 8 (Germany, May 18, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 10,816. April 8. (Germany, April 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Partitions for use in electrolysis of chlorides. 10,916. April 9. (Germany, December 23, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of anthraquinone derivatives. 11,135. April 10. (Germany, April 10, 1928.)

I.G. Farbenindustie Akt.-Ges. Low-temperature distillation of pulverulent, etc., materials. 11,203. April 11. (Czechoslovakia, April 11, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of acid wood dyestuffs. 11,242. April 11. (Germany, April 12, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial silk. 11,406. April 12. (Germany, April 12, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of phosphoric acid cement. 11,407. April 12. (Germany, April 13, 1928.)

I.G. Farbenindustrie Akt.-Ges. Electrolysis of molten substances. 11,408. April 12. (Germany, April 14, 1928.)

I.G. Farbenindustrie Akt.-Ges. Steaming fabrics printed with vat dyestuffs. 11,476. April 13. (Germany, January 3.)

I.G. Farbenindustrie. Akt.-Ges. Manufacture of water-soluble derivatives of aromatic diazo compounds. 11,482. April 13. (Germany, April 14, 1928.)

Imperial Chemical Industries, Ltd., and Saunders, K. H. Manufacture of leucoindigo. 10,872. April 8.

Imperial Chemical Industries, Ltd., and Jenkins, W. J. Manufacture of nitrocellulose solutions, etc. 11,258. April 11.

Imperial Chemical Industries, Ltd., and Jenkins, W. J. Nitrocellulose products, etc. April 11. 11,284. (March 8.)

Imperial Chemical Industries, Ltd. Manufacture of emulsion, etc. 11,500. April 13.

Kelly, A. Production of acid sodium sulphite. 10,975. April 9.

Kelly, A. Production of sodium metaborate. 10,976. April 9.

Ohle, H. Production of salts of the acid sulphuric acid esters of α- and β-diacetone fructose. 11,345. April 12.

Soc. L'Air Liquide, Soc. Anon. pour l'Étude et l'Exploitation des Procédés G. Claude. Production of hydrogen peroxide. 11,254. April 11. (France, April 14, 1928.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, 1s. 10d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 10d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 10d. to 1s. 11d. per gall. Dark, 1s. 7½d. to 1s. 8½d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED.—5½d. to 6d. per gall. for 1080/1090. Unstrained, 6½d. to 7d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 7½d. to 2s. per gall. Firm. Pure, 2s. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 2s. per gall. Pure, 1s. 8d. to 1s. 9d. per gall.

CREOSOTE.—Cresylic, 20/24%, 7½d. to 7⅝d. per gall.; Heavy, 6½d. to 6¾d. per gall. Middle oil, 4⅝d. to 5⅛d. per gall. Standard specification, 3⅝d. to 4⅞d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 3½d. to 1s. 4d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 8d. per gall. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4. 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 31s. 6d. to 35s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. to 4s. 6d. per gall. 90/180, 2s. to 3s. per gal. Heavy, 1s. 6d. to 1s. 9d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅛d. to 5¼d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 to £39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 3d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P. 2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 4d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 2d. to 2s. 4d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5½d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE —5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 1s. 11½d. to 2s. 1d. per lb.; potassium, 1s. 8½d. to 1s. 9½d. per lb.; sodium, 1s. 10½d. to 2s. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 22s. per lb. net; Synthetic, 11s. to 12s. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 5d. to 1s. 8d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 1d. to 1s. 4d. per lb.
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—3s. 11d. to 4s. 2d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—97s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2½d. to 2s. 4d. per lb. Crystal, 2s. 3½d. to 2s. 5d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 6d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—8s. 6d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—13s. 6d. per lb.
GERANIOL (PALMAROSA).—22s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—5s. per lb.
ISO EUGENOL.—15s. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 9s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. 6d. per lb. Ex Shui Oil Linalol, 10s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—52s. per lb.
SAFROL.—2s. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—18s. 6d. per lb. Ex Geraniol, 15s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 9s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—23s. 6d. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—1s. 3d. per lb.
CANANGA OIL, JAVA.—11s. per lb.
CASSIA OIL, 80/85%.—6s. per lb.
CINNAMON OIL LEAF.—9s. 3d. per oz.
CITRONELLA OIL.—Java, 2s. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 2d. per lb.
CLOVE OIL (90/92%).—11s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10½d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 17s. 6d. per lb.
LEMON OIL.—20s. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—26s. 6d. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 14s. 3d. per lb.; Japanese, 7s. 6d. per lb.
PETITGRAIN.—10s. per lb.
SANDALWOOD.—Mysore, 28s. per lb.: 90/95%. 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greef & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, April 18, 1929.

BUSINESS during the current week has been quite satisfactory, prices on the whole remain firm. Buyers are shewing more tendency to book forward contracts. The improvement in the export trade has continued.

General Chemicals

ACETONE is unchanged with a very firm position at £75 to £85 per ton, according to quantity, and in short supply for early delivery.

ACETIC ACID.—There is a considerable increase in demand; prices firm and unchanged at £36 10s. to £37 10s. per ton for 80% grades.

ACID CITRIC.—The scarcity of this article continues; position very firm.

ACID FORMIC.—Steady at £42 10s. for 85%, with a little better demand.

ACID LACTIC is unchanged and steady at £43 per ton for technical 50% by weight.

ACID OXALIC.—The demand continues; position very firm at £30 10s. to £32 per ton, according to quantity.

ACID TARTARIC is firm at 1s. 4½d. per lb., less 5%, and in fair demand.

ALUMINA SULPHATE is unchanged at about £7 10s. to £8 per ton, and still in short supply for early delivery.

AMMONIUM CHLORIDE is unchanged.

ARSENIC.—Position easy at £16 5s. per ton, free on rails at mines.

BARIUM CHLORIDE.—The demand during the current week has increased; price firm at £11 10s. to £12 per ton, and short for early delivery.

CREAM OF TARTAR.—The improvement in the inquiry has continued, and price remains firm at £94 to £98 10s. per ton 99/100%.

COPPER SULPHATE.—As the season approaches, the demand continues brisk, and the market is extremely firm.

FORMALDEHYDE.—Price firm at £39 per ton, with a very steady demand.

LEAD ACETATE is still a little unsettled; prices unchanged at £45 per ton for white and £44 per ton for brown.

LEAD NITRATE is a little easier at £37 per ton.

LIME ACETATE is firm at £18 per ton for grey quality.

LITHOPONE is unchanged at £19 15s. to £22 per ton.

METHYL ACETONE continues in fair demand, price unchanged at £58 to £60 per ton.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.

POTASSIUM CHLORATE is firm at £28 to £30 per ton.

PERMANGANATE OF POTASH.—In good demand and firm at 5½d. per lb. for the B.P. quality.

POTASSIUM PRUSSIATE is firm at £63 10s. to £65 10s. per ton, with an increased inquiry.

SODIUM ACETATE.—Standard crystals are still in short supply, and price very firm at £21 5s. to £22 5s. per ton.

SODIUM BICHROMATE continues firm at 3½d. per lb., with the usual discounts for contracts.

SODIUM HYPOSULPHITE.—The improved demand for the photographic quality continues, with a firm position at £15 per ton, commercial quality in small demand.

SODA NITRATE is firm and unchanged at £20 per ton.

SODIUM PHOSPHATE.—Dibasic quality at £12 per ton; Tribasic at £17 10s. per ton, position firm.

SODA PRUSSIATE is unchanged at 4¾d. to 5½d. per lb., with a steady demand.

TARTAR EMETIC is unchanged at 10½d. per lb.

ZINC SULPHATE is unchanged and firm at £12 10s. per ton.

Coal Tar Products

There is little change to report in the prices of coal tar products from last week, the market remaining quiet.

MOTOR BENZOL remains at about 1s. 8¾d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is unchanged at about 1s. 3d. per gallon, f.o.r. makers' works.

HEAVY NAPHTHA is quoted at 1s. 3d. per gallon on rails.

CREOSOTE OIL remains weak, and is quoted at 4¾d. per gallon on rails in the north, and at 5½d. per gallon in London.

CRESYLIC ACID remains unchanged, the 98/100% quality being quoted at about 1s. 10d. per gallon, and the dark quality 95/97% at about 1s. 8d. per gallon f.o.r.

NAPHTHALENE.—The firelighter quality remains at about £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.

PITCH.—There is little business, and prices remain weak at 30s. to 32s. 6d. per ton, f.o.b.

Nitrogen Products

Sulphate of Ammonia.—During the past week the price of sulphate of ammonia has continued firm at £10 2s. per ton, f.o.b. U.K. port, in single bags. At the moment supplies are not plentiful, and there seems little likelihood of a break in this price until the large continental producers are prepared to make lower offerings.

Home.—The demand in the home market continues to be large. It is understood that most of the makers are fully sold for the present month.

Nitrate of Soda.—A good sale of nitrates is reported at the scale price in the United Kingdom and also in the continental countries.

Latest Oil Prices

LONDON, April 17.—LINSEED OIL closed steadier. Spot, ex mill, £29; April, £28; May-August, £28 10s.; and September-December, £29 5s., naked. RAPE OIL was slow. Crude extracted, £41; technical refined, £43, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £27 10s.; refined common edible, £34; and deodorised, £36, naked, ex mill. TURPENTINE was steady but inactive at 3d. per cwt. advance. American, spot to December, 42s. 6d.

HULL.—LINSEED OIL.—Spot to April, £28 7s. 6d.; May, £28 10s.; May-August, £28 12s. 6d.; September-December, £29 per ton, naked. COTTON OIL.—Bombay crude, spot, £26; Egyptian crude, spot (new), and April and May-August, £26 10s.; edible, refined, spot and April and May-August, £30 10s.; technical, spot, £30; deodorised, spot, £32 10s. per ton, naked. PALM KERNEL OIL.—Crushed, 5½ per cent., £34 10s. per ton, naked. GROUNDNUT OIL.—Crushed extracted, £32 10s.; deodorised, £36 10s. per ton. SOYA OIL.—Extracted and crushed, £30; deodorised, £32 10s. per ton. RAPE OIL.—Crushed extracted, £41 10s.; refined, £43 10s. per ton, net cash terms, ex mill. TURPENTINE, CASTOR OIL and COD OIL unaltered.

South Wales By-Products

SOUTH WALES by-product activities have strengthened slightly, but business generally is still far from satisfactory. The call for pitch has increased, but prices continue nominal round 32s. 6d. to 35s. delivered, and 31s. to 33s. per ton f.o.b. Creosote has a weak call round the 4¼d. to 5¼d. per gallon mark, but benzol, with another petrol rise in prospect, remains firm. Road tar is unchanged, buying being slow round the 10s. to 12s. per 40-gallon barrel mark. Crude tar is slightly better, and has a fair demand at 25s. to 29s. per ton. Refined tars are unchanged, coke-oven tar having a fair demand at 7d. to 7¾d. per gallon delivered, and gasworks tar at from 6¼d. to 6¾d. per gallon delivered. Crude naphthalene has scarcely any demand at about 80s. per ton, and whizzed is dead at about 100s. per ton. Patent fuel exports are slightly better, but prices are unchanged. Quotations are 21s. to 21s. 6d. ex-ship, Cardiff; 19s. 6d. to 20s. 3d. ex-ship, Swansea. Coke exports are unchanged, best foundry, 32s. 6d. to 36s. 6d.; good foundry, 26s. 6d. to 32s.; and furnace, 19s. to 21s. per ton.

Sulphur from Canadian Smelter Plants

PROFESSOR M. C. BOSWELL, of the faculty of applied science in the University of Toronto, is said to have developed an important new process for the extraction of sulphur from the sulphur dioxide gas produced in Canadian metallurgical plants. At present three million dollars' worth of sulphur is brought annually into Canada, the greater portion of which is used by the pulp and paper industry. Should Professor Boswell's discovery lead to the economical production of sulphur, the benefit, not only to the mining industry, but also to the pulp and paper industry, would be very great. It is believed that as much as six or seven per cent. of the fumes from Canadian smelters consists of sulphur dioxide, the effect of which on surrounding vegetation is very serious.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, April 17, 1929.

DURING the past week the heavy chemical market has maintained the improvement last reported, and business both for home and export has been very good. Prices remain practically unchanged.

Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton; powder, £38 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at 6¼d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2½d. per lb., less 5%, ex store, spot delivery. Offered at 2s. 2¼d. per lb., less 5%, ex wharf, prompt shipment from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC.—80° quality, £24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Price remains unchanged at about 3½d. per lb., ex store. Offered for prompt shipment from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Spot material rather dearer at about £6 per ton, ex store. For prompt shipment, £5 15s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Unchanged at about £8 12s. 6d. per ton, c.i.f. U.K. ports. Crystal meal offered on spot at £9 per ton, ex store.

AMMONIA, ANHYDROUS.—Quoted 9½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanizers crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Now quoted £37 10s. per ton, c.i.f. U.K. ports, prompt shipment from China. Spot material still on offer at £40 per ton, ex store.

ARSENIC, WHITE POWDERED.—Unchanged at £18 5s. per ton, ex wharf, prompt despatch from mines. Spot material quoted £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Quoted £10 10s. per ton, c.i.f. U.K. ports, prompt shipment.

BLEACHING POWDER.—British manufacturers contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers price £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Good inquiry and price unchanged at about £37 10s. per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—On offer at £29 15s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material now quoted £26 10s. per ton, ex store. Offered from the Continent £25 10s. per ton, c.i.f. U.K.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 6¼d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA, CAUSTIC.—Powdered, 98/99%, now £17 10s. per ton in drums; £18 15s. per ton in casks; solid, 76/77%, £14 10s. per ton in drums; and 70/72%, £14 2s. 6d. per ton in drums, all carriage paid buyer's stations, minimum 4 ton lots, for contracts 10s. per ton less.

SODIUM ACETATE, 65%.—Crystal quality quoted about £19 15s. per ton, ex wharf; '73/78% anhydrous quality on offer at £20 per ton, carriage paid buyers' stations.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—3½d. per lb., delivered U.K. or c.i.f. Irish ports, less 2½% for contract, minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton, ex quay, minimum 4 ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4 ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4 ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality quoted £10 12s. per ton, carriage paid buyers' sidings, minimum 6 ton lots, usual extras for small quantities and refined qualities.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works; 52s. 6d. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption:—Solid, 60/62%, £9 per ton; broken, 60/63%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyer's works on contract, minimum 4 ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Report of English China Clays

THE directors of English China Clays, Ltd., declared no interim dividend on the ordinary shares during 1928, but they now announce a final distribution of 3 per cent. for the year, which is the same as was paid for 1927 and 1926, and which compares with 4½ per cent. for the three years beginning 1923. The net profit for the year was £71,923, against £77,601 for 1927, and, with £15,974 brought forward, the directors have £87,897 at their disposal. The dividends on the ordinary and preference shares require £70,835, against £66,021 a year ago, and a balance of £17,062 remains to be carried forward. A year ago there was an allocation to the reserve of £5,000, bringing that fund up to £35,000. The company, which has its head office at St. Austell, Cornwall, was formed in 1919 to acquire three existing companies engaged in the China Clay trade. Two more companies were acquired in 1920, and the company also owns the entire share capital of five other concerns in the trade. The authorised capital is £2,000,000, of which £400,000 is in 7 per cent. cumulative preference shares of £1 each and the remainder in ordinary shares. The present balance-sheet shows that 399,070 of the preference shares and 1,430,000 of the ordinary shares had been issued at December 31 last, compared with 394,186 preference and 1,413,000 ordinary a year previously. Properties, at £1,148,931, show a decline of £1,006 as compared with a year previously, plant, wagons, etc., are £13,910 higher at £139,239, freeholds and leaseholds are £7,931 higher at £68,233, and investments, at £407,333, show an advance of £64,636.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, April 18, 1929.

Individual transactions in chemicals on the open market during the past week have for the most part not related to important quantities, but in the aggregate a moderate business has been done. Competition among sellers is, however, extremely keen, and margins are narrow in consequence. Calls for deliveries against contracts have been about up to the level of recent weeks, and in the majority of instances quotations are fully maintained, a sagging tendency being a rarity.

Heavy Chemicals

Chlorate of soda continues to be offered in the neighbourhood of 2¾d. per lb., and a moderate demand for the material has been reported. Conditions in regard to sulphide of sodium remain relatively quiet, but prices are reasonably steady at about £9 10s. per ton for the 60-65 per cent. concentrated solid quality and £8 for the commercial. Firmness is a feature of the prussiate of soda section, current values now ranging from 4⅞d. to 5d. per lb., according to quantity, with buying interest in the material on moderate lines. Bichromate of soda is in fair request, and quotations are well held on the basis of 3½d. per lb. up to the end of June. A quiet business is passing in the case of phosphate of soda at about £11 15s. per ton. Alkali continues on offer at round £6 per ton, and a steady inquiry is being met with. There has been no change in the price position of bicarbonate of soda, and a fair trade has been reported this week on the basis of £10 10s. per ton. Hyposulphite of soda is attracting some attention, and values are maintained; offers of the photographic grade are in the neighbourhood of £15 10s. per ton, and of the commercial product at from £8 15s. to £9. Caustic soda is moving off in moderate quantities at prices ranging from £12 15s. to £14 per ton, according to quality, and in contract parcels. With regard to saltcake, current sales of this material are on rather quiet lines, although at round £2 12s. 6d. per ton values show little change compared with those current a week ago.

In the potash section, yellow prussiate keeps steady, and meets with a fair volume of inquiry at from 6¾d. to 7¼d. per lb., according to quantity. Chlorate of potash is on offer at from 3d. to 3¼d. per lb., and a quiet business is being put through. Buying interest in carbonate of potash has been somewhat less active this week, but values are maintained at £26 5s. per ton. There is a moderate demand about for permanganate of potash, with the B.P. quality quoted at about 5¼d. to 5½d. per lb., and the commercial at 5d. Bichromate of potash is moving fairly satisfactorily, and values keep up at 4¼d. per lb. Caustic potash is a firm section, and a moderate weight of buying is going on on the basis of £33 5s. per ton for prompt delivery of one- to five-ton lots.

Easier conditions are in evidence in respect of sulphate of copper, current offers of this being at £29 10s. to £30 per ton, f.o.b. With regard to arsenic, there is still only a moderate demand about for this material, and round £16 per ton at the mines for white powdered, Cornish makes, is the basis of to-day's prices. Acetate of lime is quoted here at from £17 to £17 5s. per ton for the grey quality and up to £9 for the brown, a quietly steady trade being put through. Nitrate of lead shows little change at about £35 per ton, but the acetates are a shade easier at £41 10s. per ton for the white and £40 10s. for the brown material.

Acids and Tar Products

Oxalic acid is attracting a moderate amount of interest, and quotations for this are steady at £1 12s. per cwt. Acetic acid is a fairly active section of the market, with the glacial quality on offer at £66 to £67 per ton and the 80 per cent. commercial grade at £36. Tartaric acid meets with a quiet demand at 1s. 4½d. per lb., with citric acid on offer at round 2s. 2d. per lb.

Pitch is dull and easy at about £1 11s. per ton, f.o.b., and business in this material is on quiet lines. The demand for creosote oil also is only of moderate extent, with offers at about 3½d. per gallon, naked. Solvent naphtha continues to move off in moderate quantities, and prices are firmer at 1s. 3¾d. to 1s. 4d. per gallon. Round 1s. 10d. per gallon is still being asked for prompt lots of crude carbolic, and crystallised meets with a steady demand at up to 6½d. per lb., f.o.b.

Company News

Weardale Lead Co.—An interim dividend of 6d. per share, less income tax, is announced, payable on April 18.

British Celanese, Ltd.—The directors have decided to pay the dividends due on April 30 on the first and second preference shares.

Borax Consolidated.—A dividend has been declared at the rate of 6 per cent. per annum, less income-tax, on the preferred ordinary shares in respect of the half-year ending March 31, 1929.

Usines A. Zinc Vieille Montagne (Brussels).—The net profits for the past year amounted to 59,693,839 f., as compared with 52,726,003 f. last year. The dividend is unchanged at 180 f. per share.

Newton Chambers and Co.—A profit for 1928 of £31,159 is reported, which, with £60,282 brought in, makes £91,441. A final dividend is recommended of 3½ per cent. on the ordinary shares, making 6 per cent. for the year, tax free, leaving £54,666 to be carried forward.

American Potash and Chemical Co.—The net profit for the year 1928 after all charges, including depreciation, was $1,566,541. A dividend of 25 cents per share was paid for each of last three quarters of 1928 and an extra dividend of 25 cents was paid in December. A dividend of 25 cents per share was declared on March 20, 1929, on the capital stock of company for the quarter ended March 31, 1929.

Angela Nitrate Co.—For the year ended December 31, 1928, the report states that the profit and loss account shows a gross profit of £22,559. Deducting London expenses, £2,611, income-tax (Chile), £224, legal charges, £238, and repairs, £487, there remains £18,999, which, with balance brought forward of £3,020, makes £22,019. The directors propose placing to reserve account £5,000, and recommend payment on April 27 of a further dividend of 15 per cent. (3s. per share), less income-tax, making, with the interim dividend, 25 per cent. for year, carrying forward £3,019.

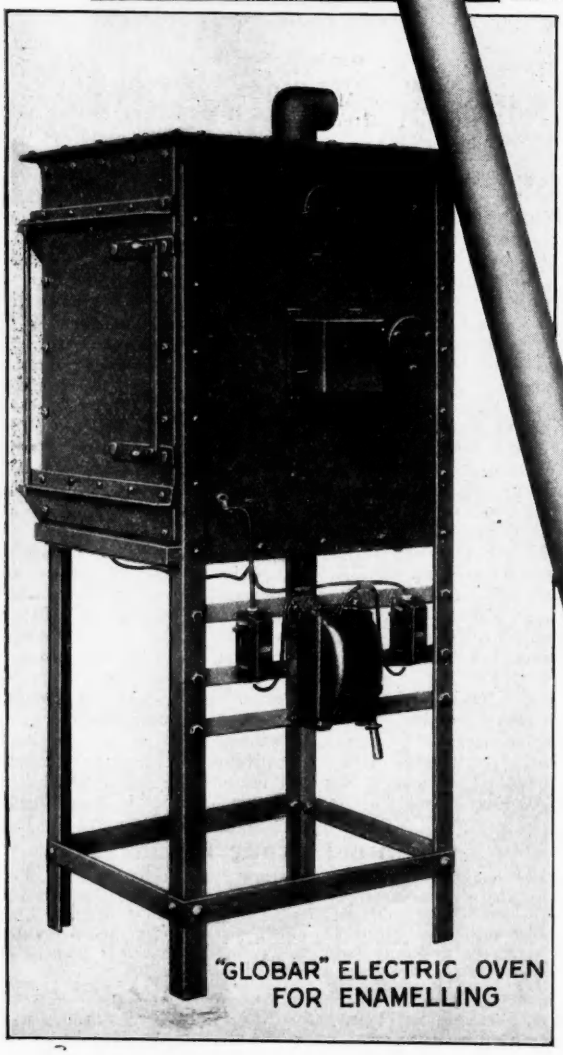
Rio Tinto Co.—The net trading profit for the year ended December 31, 1928, was £1,669,782. From this falls to be deducted the arrears of taxes in Spain chargeable to the produce shipped, less credit in aid from taxes account, £265,957, leaving £1,403,825. Other credits brought into revenue account were £131,475, making £1,535,300. After deducting cost of administration, writings-off, and other expenses chargeable to revenue, amounting to £488,218, there remains £1,047,082, against £1,016,840 for 1927, which, with the balance brought forward of £151,539, gives £1,198,621. The directors have deemed it prudent to appropriate to an emergency account £200,000 and they recommend a final dividend of 25s. per share on the ordinary shares, making a total distribution of 40s. per share, against 50s. per share for 1927, carrying forward £167,371.

Indestructible Paint and Standard Varnish, Ltd.—In a circular accompanying the annual report it is stated that a contract has been entered into with the Standard Varnish Works of New York for the acquisition of their businesses in the British Empire (other than Canada) and in Europe, in consideration of the issue to the Standard Varnish Works of 58,000 ordinary shares of the Indestructible Paint Co., credited as fully paid. The directors of the Indestructible Paint Co. consider it desirable to take advantage of this occasion to increase the capital from £100,000 to £250,000 by the creation of 60,000 7 per cent. cumulative preference shares and 90,000 ordinary shares. It is proposed to apply the cash capital made available, first, in repayment of the company's bank overdraft, and second, in the provision of working capital for the further development of the business of the company. After charging all repairs and maintenance, etc., and writing off all bad debts, the net profit for the year ended December 31, 1928, amounts to £25,522, against £15,330 for 1927. Adding the brought forward of £2,136, there is a total of £27,658. The directors recommend transferring to reserve for income-tax £3,300, against £1,700, to reserve account £6,500, against £5,000, writing down goodwill by £5,000, and paying a dividend of 10 per cent. and a bonus of 2½ per cent., both less tax, as compared with a dividend only of 10 per cent. for 1927, carrying forward £3,483.

Globar

GLOBAR IS A CARBORUNDUM PRODUCT

The Non-Metallic
CARTRIDGE TYPE
Electric Heating Element
For domestic and Industrial applications



"GLOBAR" ELECTRIC OVEN FOR ENAMELLING

What is Globar?

Globar is a Carborundum Product—a resistance rod made principally of Carborundum—a non-metallic element for producing electric heat.

Globar is so flexible in its operation—so adaptable to electric heating conditions—that perfect temperature control is possible from 50°F. up to 2750°F.

It can be applied to almost any electric heating condition.

Made in rods of standard sizes from five inches to six feet long, one-quarter to two-and-a-half inches in diameter and to various watt capacities.

Globar develops greater effective heat per unit of power, therefore it is the element of economy.

Globar elements are strong and rigid even at high temperatures—there is no burning out, no decomposition under 3000°F.

Simplicity of mounting—the development of "Cold End" terminals—the ease with which an element can be replaced—all of these features combine in making Globar an outstanding development in electric heating.

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APPLICATIONS.

Wall Heaters	Therapeutics	Core Ovens
Portable Heaters	Forging Furnaces	Ladle Heaters
Fireplaces	Annealing Furnaces	Kilns and Dryers
Fire Logs	Heat-Treatment Furnaces	Porcelain Bakers
Water Heaters	Assay Ovens	Laboratory Work

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National Supply of Radium

Committee's Report

THE RADIUM SUB-COMMITTEE, which was appointed on July 7 last year by the Committee of Civil Research "to examine the radium requirements of Great Britain in relation to the present sources of supply," has issued its report. It recommends that steps should be taken at once to ensure the acquisition by instalments of twenty grammes of radium element for medical purposes. The amount of radium belonging to the Government which is available for medical purposes in England, Scotland and Wales is 2·2 grammes; and the estimated amount believed to be the property of hospitals and private medical practitioners, or likely so to be in (say) three months' time, is approximately 22·7 grammes, making a total of 24·9 (say 25) grammes.

The Committee further states that the amount required to meet existing needs in Great Britain is probably approximately 49 or 50 grammes, which means that an immediate addition of about 24 grammes to the existing national stock is required. Owing, however, to the lack of trained personnel and to the inadequacy of the available hospital accommodation, it is probable that not more than 20 additional grammes of radium could be effectively absorbed for medical purposes by the end of 1930.

Centralisation

In the opinion of the Committee "there exists a pressing need for the establishment of a central stock of radium and the organisation of some systematic method for its distribution." The central body should be given powers not only to purchase radium for its own purposes, but also to act, when so requested, as a buying agent for hospitals and other institutions in this country or for Dominion or Colonial Governments. The Committee recommends that "a body of trustees should be appointed, entitled the National Radium Trustees, whose duty it should be to hold the funds provided by Parliament or otherwise and to purchase therewith and hold radium for use by the Radium Commission" (which latter should be set up).

The present retail price of radium is £12 a milligramme; and, if the 20 grammes suggested are purchased, the expenditure would, therefore, be £240,000; but the Committee remarks that if the central stock is established they have no doubt that it will be possible to buy through a single agency "at a substantially lower figure" than £12. To raise £200,000, "which is needed at once," the Committee suggests that the best plan would be for the Government to undertake to contribute pound for pound subscribed by the public, "up to some maximum sum to be determined," and the Government have agreed to act on this proposal.

The German Coke Oven Industry

RECENT German reports state that at the beginning of 1926 there were 140 coke oven plants in the Ruhr district, with a total of about 16,000 ovens, mostly of old pattern, and having a total capacity of 28,000,000 tons of coke per annum. Between 1926 and 1928 nearly 3,000 new ovens have been erected at 32 different plants, of which just over a thousand were installed in existing plant and the remainder formed entirely new plants. There are now in the Ruhr district 36 large coke oven plants, comprising nearly 7,000 ovens, with a total capacity of 25,000,000 tons coke annually. Over 6,000 old ovens have been discarded, and the total number now working, including several small plants and all the new ones, is about 13,000 ovens. The 36 large plants above referred to are now responsible for about 91 per cent. of the total German output of coke. The capital cost of new coke oven plant in Germany varies from 17 mks. per ton of output for a plant with an annual capacity of 1,250,000 tons, to 17.35 mks. for a plant with annual capacity of 1,000,000 tons, and to 22.8 mks. for an output of 200,000 tons. Labour costs, owing largely to more intensive working, larger and more efficient ovens of newest type and rationalisation generally, have been very considerably reduced. For the same output of about a million tons per annum the new plants require a labour force of about 130, as compared with 170 to 200 for the old plants. Wear and tear on the new plants is, of course, greater, and considerable care is required in selection of materials of construction.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

JONES BROTHERS (WEST BROMWICH), LTD., chemical merchants. (M., 20/4/29.) Registered April 6, £10,000 debenture, to J. A. Robinson, 75, Birmingham Road, West Bromwich, and another; general charge (ranking in priority to existing debentures). *£2,025. December 28, 1928.

ORAVOX, LTD., London, W., manufacturers of medical equipment, etc. (M., 20/4/29.) Registered April 4, £10,000, debenture, to F. G. Rust, Codmore Cottage, Chesham, builder, and another; general charge. *Nil. January 12, 1929.

New Companies Registered

BRITISH BITUMEN EMULSIONS, LTD.—Registered as a "public" company on April 10. Nom. capital, £80,000 in 5s. shares. To acquire the undertakings and all or part of the assets of Bitumuls (U.K.), Ltd. and Colfix (London), Ltd.; to adopt agreements (*a*) with Bitumuls (U.K.), Ltd., (*b*) with Colfix (London), Ltd., (*c*) with International Bitumen Emulsions, Ltd., Bitumuls (U.K.), Ltd.,, and Colfix (London), Ltd., (*d*) with G. Gemmell, (*e*) with G. S. Hay, and (*f*) with H. R. Temperley, to deal in and dispose of bitumen, tar, tar products, and any material for use therewith, to construct, repair, maintain and improve roads and road surfaces, to carry on business as civil engineers, contractors for public and other works and buildings, miners, quarriers, artificial stone makers, etc. A subscriber: W. H. Barnes, 12, Hamilton Road, Thornton Heath.

COAL CARBONISATION, LTD., 15, St. Helen's Place, London, E.C.—Registered April 11. Nom. capital, £100 in £1 shares. To acquire benefit of or a licence in respect of certain existing inventions relating to low temperature carbonisation of coal and other fuels, and to adopt an agreement with the Leeds Fireclay Co., Ltd.

MURRAY, BULL AND SPENCER, LTD.—Registered, April 11. Nom. capital, £12,000 in £1 shares. To acquire the business of consulting and research chemists carried on by H. D. Murray and D. A. Spencer, in London, as "Murray, Bull and Spencer." Directors: H. D. Murray, 10, Fawcett Street, London, S.W.10; D. A. Spencer, and C. B. Tuson.

SYNTHETIC NITROGEN CO., LTD.—Private company. Registered April 10. Nom. capital, £5,000 in £1 shares. To carry on the business of manufacturers, exporters, importers and workers of and dealers in nitrates, natural and synthetic nitrogen, nitrogenous products of all kinds, minerals, chemicals, fertilizers, artificial manures, etc. A subscriber: H. W. Humphries, The Manor House, Grovelands Road, Purley.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

NAPHTHALENE, TAR, ACIDS, ETC.—The Prisons Administration, Ministry of the Interior, Cairo, is inviting tenders, to be presented by noon on May 25, for the supply of naphthalene, tar, acids, etc. (Reference No. C. 3022.)

COMMERCIAL SULPHURIC ACID AND SODIUM CYANIDE.—The Egyptian Ministry of Agriculture invite tenders, to be presented in Cairo by May 26, for the supply of commercial sulphuric acid and sodium cyanide required by the Plant Protection Section, Ministry of Agriculture, Cairo, (Reference No. BX. 5227.)